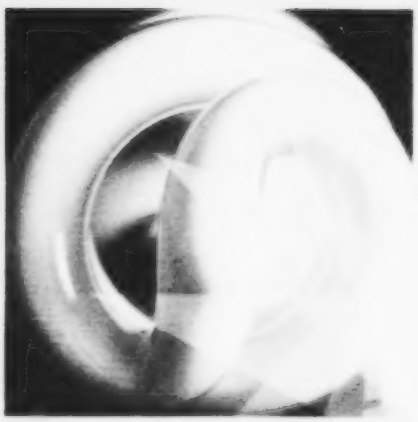
BUILDING ENERGY, BUILDING LEADERSHIP



RECOMMENDATIONS FOR
THE ADOPTION, DEVELOPMENT,
AND IMPLEMENTATION OF A COMMERCIAL
BUILDING ENERGY CODE IN MANITOBA

Report from the **Manitoba Energy Code Advisory Committee** / September 2006

This report has been printed using only vegetable-based inks on Save-a-Tree, FSC (Forest Stewardship Council) certified paper from Unisource Canada. This 100% post-consumer waste recycled paper is processed chlorine-free (PCF) and saves trees, energy, landfill space and water. For additional copies of this report on-line, we encourage you to visit www.manitobaenergy.ca

TREES SAVED:	6
WATER SAVED:	5,097 GALLONS
NET GREENHOUSE EMISSIONS REDUCED:	1,048.5 LBS.
WOOD SAVED:	3,466.5 LBS.
LANDFILL REDUCED:	540.8 LBS.
ENERGY REDUCED:	6,900 (BTU) (000)

Save-A-Tree

ABSTRACT

Building Energy, Building Leadership provides recommendations for the adoption, development, and implementation of a commercial building energy code in Manitoba. The report, prepared by the Manitoba Energy Code Advisory Committee for the Minister of Manitoba Energy, Science and Technology, recommends the adoption of the *Model National Energy Code for Buildings* (1997), the development of Manitoba Amendments requiring a level of building energy efficiency up to 25% better than the *Model National Energy Code*, and Manitoba's participation in a national initiative to update the *Model National Energy Code for Buildings*. The report also includes a description of the Committee, an introduction providing context on energy use and energy efficiency in Manitoba and around the world, and supplemental recommendations for a sustainable building code, integrated design, and building commissioning.

TABLE OF CONTENTS

Chairperson's Letter 2

Committee Member Ratification 3

Executive Summary 4

Summary List of Recommendations 5

Manitoba Energy Code Advisory Committee 6

Introduction 7

Advisory Committee Recommendations

Code Adoption Recommendations 11

Code Development Recommendations 43

Code Implementation Recommendations 51

Supplemental Recommendations 53

Appendix A: Terms of Reference 58

Appendix B: Presentations and Submissions 62

Appendix C: Committee Members and Staff 63

Endnotes 64

CHAIRPERSON'S LETTER

The Honourable David Chomiak
Minister of Energy, Science and Technology
Legislative Building, Winnipeg, Manitoba

September 2006

Dear Minister Chomiak:

I am writing to present you with the report of the Manitoba Energy Code Advisory Committee titled *Building Energy, Building Leadership: Recommendations for the Adoption, Development, and Implementation of a Commercial Building Energy Code in Manitoba*. The report is in response to your request for a set of recommendations to establish an energy code for new commercial construction in Manitoba.

In September 2005 you appointed 15 Manitobans – as individuals, not as representatives of their respective organization or profession – to the Energy Code Advisory Committee. It was a privilege and an honour to work with Committee members Tom Akerstream, Ken Allard, Nancy Anderson, Richard Andrich, Anne Auger, Dennis Beacham, Bob Downs, Robert Eastwood, Chris Hewitt, Deepak Joshi, Ken Klassen, Burt Phillips, Rodney Wiebe, David Woelk, and Sue Ziemski. All of these professionals are highly knowledgeable and experienced in their field. As a group they are reflective of a broad cross section of the commercial building industry in Manitoba.

The Committee's report contains 17 recommendations. In summary, the Committee recommends Manitoba adopt the *Model National Energy Code for Buildings* (1997), develop and adopt Manitoba Amendments to the *Model National Energy Code for Buildings* by January 1, 2009, and support and participate in a national initiative to update the *Model National Energy Code for Buildings*. The Committee also prepared three supplemental recommendations, reflecting interests beyond energy efficiency.

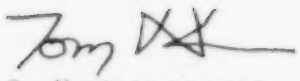
This report was due in April 2006. Postponing its delivery by five months provided an opportunity to meet with provincial and national building code authorities, and incorporate outcomes from these meetings into the report. In May, Committee members met with the Manitoba Building Standards Board to discuss the draft recommendations. In June, I met with senior representatives of the Canadian Commission on Building and Fire Codes, to further our understanding of the process to update the *Model National Energy Code for Buildings*. In August I met with representatives of the Department of Labour and Immigration.

The photos and images in the report were supplied by local building owners and design firms. All photos and images are of energy efficient buildings in Manitoba. These buildings demonstrate the ability of Manitoba professionals to design, approve, and construct cost-effective energy efficient buildings that are functional, safe, and a pleasure in which to live, work, and play.

Sincerely,

Rodney C. McDonald, B.A., M.A., LEED® AP
Chair, Manitoba Energy Code Advisory Committee

COMMITTEE MEMBER RATIFICATION

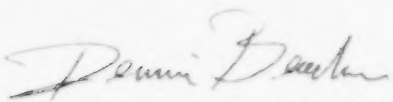


Tom Akerstream, B.Arch, B.E.S.
Project Energy Advisor,
Downtown Office Project, Manitoba Hydro

Chris Hewitt, B.Eng(Hons), C.Eng(UK), MIEE, LEED® AP, P.Eng.
Partner, SMS Engineering Ltd.

Ken Allard
Superintendent of Public Works,
City of Thompson

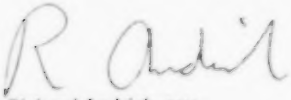
Deepak Joshi
Manager, Development and Inspections Division,
City of Winnipeg



Nancy Anderson, LL.B.
Manager, Codes & Standards
Manitoba Office of the Fire Commissioner

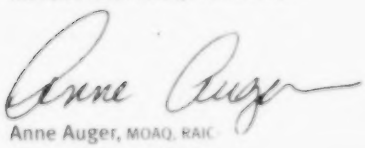
Dennis Beacham (Alt.)
Codes & Standards Officer

Ken Klassen, C.E.T.
Energy Policy Analyst,
Manitoba Energy, Science and Technology

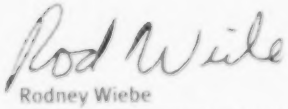


Richard Andrich, SMA
Facilities/Operations Manager,
The Forks North Portage Partnership

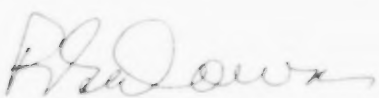
Bert Phillips, P.Eng., MBA
UNIES Ltd.



Anne Auger, MOAQ, RAIC
Director, Buildings Division,
Office of Energy Efficiency, Natural Resources Canada

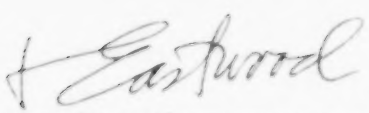


Rodney Wiebe
Ben Wiebe Construction (1985) Ltd.

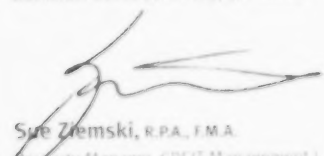


R.G. (Bob) Downs, CA
Development Manager, Shindico Realty Inc.

David Woelk, C.E.T., G.S.C.
Manager, Field Operations,
Bockstael Construction (1979) Limited



Robert Eastwood, FRAIC, MAA, OAA, SAA, MAAA, MAIBC
Principal, Number Ten Architectural Group



Sue Ziemski, R.P.A., F.M.A.
Property Manager, CREIT Management L.P.

EXECUTIVE SUMMARY

- The purpose of this report, *Building Energy, Building Leadership*, is to present a strategy and a set of recommendations for the adoption, development, and potential implementation of an energy code for new commercial construction in Manitoba.
- This report was prepared by the Manitoba Energy Code Advisory Committee for the Minister of Manitoba Energy, Science and Technology.
- The Energy Code Advisory Committee was comprised of 15 people from a broad cross section of the Manitoba commercial building industry.

- There is ample local, national, and global interest in improving energy efficiency in buildings.
- Four local professional organizations expressed support for a commercial building energy code in Manitoba: Building Energy Management Manitoba; Building Owners and Managers Association (Manitoba); Manitoba Building Officials Association; Mechanical Contractors Association of Manitoba.
- Canada's Council of Energy Ministers have pledged to work together to encourage greater energy efficiency in Canada and have endorsed a recommendation to update Canada's *Model National Energy Code for Buildings*.
- The American Society for Heating, Refrigeration and Air Conditioning Engineers, as well as the Canadian Renewable Energy Alliance, the American Institute of Architects, and the World Business Council for Sustainable Development all support aggressive reductions in building energy use.

- Manitoba is a leader in establishing energy efficiency requirements for new houses, but there are no energy efficiency requirements for commercial buildings.
- In Manitoba, between 1989 and 2003, there was an overall 19% decrease in natural gas use by houses, and an overall 8% increase in natural gas use by commercial buildings.
- In 2003, Manitoba's energy expenditures totalled $2.8 billion. Approximately 70%, or $2 billion, was spent on imported energy, mostly for transportation and buildings.
- On average, 62% of energy demand in Manitoba commercial buildings is met by natural gas, a non-renewable fossil fuel.

- Energy efficiency requirements for new buildings are common practice in countries around the world, including the European Union, U.K., and China.
- In the United States, 48 states, including North Dakota and Minnesota, have a commercial building energy efficiency code.
- In Canada, the *Model National Energy Code for Buildings* was developed, and published in 1997, by the Canadian Commission on Building and Fire Codes.

- *Building Energy, Building Leadership* includes 17 main recommendations (see opposite page) and three supplemental recommendations.

Most notably, the Energy Code Advisory Committee recommends Manitoba:

- Adopt the *Model National Energy Code for Buildings* (1997) as a regulation under *The Buildings and Mobile Homes Act*.
- Develop and adopt Manitoba Amendments to the *Model National Energy Code for Buildings* by January 1, 2009.
- Support and participate in a national initiative to update the *Model National Energy Code for Buildings*.
- Consider an energy code as the critical first step in a longer-term process towards a sustainable building code.

SUMMARY LIST OF RECOMMENDATIONS

Adopt an energy code for all new commercial construction in Manitoba.

Adopt the *Model National Energy Code for Buildings*.

Adopt the *Model National Energy Code for Buildings* as a regulation under *The Buildings and Mobile Homes Act* by January 1, 2009.

Amend *The Energy Act* to provide support for adopting the *Model National Energy Code for Buildings* under *The Buildings and Mobile Homes Act*.

Adopt the energy code within the context of a complete market transformation approach.

Appoint a representative of a Manitoba organization with a focus on energy efficiency to the Manitoba Building Standards Board in 2006.

Establish a multi-stakeholder Energy Code Task Group of the Manitoba Building Standards Board in 2007, with Secretariat support provided by Manitoba Energy, Science and Technology.

Commission a series of studies to better understand market impacts.

Develop and adopt Manitoba Amendments to the *Model National Energy Code for Buildings* (1997) by January 1, 2009.

Include acceptance testing for code compliance in the Manitoba Amendments to the *Model National Energy Code for Buildings* (1997).

Support and participate in a national initiative to help update the *Model National Energy Code for Buildings*.

Broadly communicate the Energy Code Advisory Committee recommendations.

Undertake a public review of the Committee's recommendations in 2007.

Provide information resources, and support education and technical resources, to help build industry capacity.

Establish a process for energy code compliance.

Regularly review and update the Manitoba Amendments to the energy code.

Evaluate the energy code to assess impacts and progress.

MANITOBA ENERGY CODE ADVISORY COMMITTEE

The Manitoba Energy Code Advisory Committee was established in September 2005 to advise the Minister of Energy, Science and Technology on energy efficiency requirements for new commercial construction in Manitoba. The Committee's specific task was to prepare a strategy and recommendations for the development, adoption, and implementation of minimum energy efficiency requirements for cost-effective new commercial construction – new buildings, new additions to existing buildings, and major renovation of existing buildings.

The Committee was chaired by Rodney C. McDonald, representing Manitoba Hydro. The Committee's 15 members were appointed as individuals, to share their knowledge and experience rather than represent their firm, company, agency, organization, or profession. The committee members were drawn from a cross section of the Manitoba commercial building industry (architecture, building development, building management, building ownership, construction, and engineering), federal, provincial and municipal government (policy development and code enforcement), and a Crown energy utility (see Appendix C for a list of the committee members). The report was written by the Chair with Committee review, and Secretariat support was provided by Manitoba Hydro.

The Committee met monthly from October 2005 to April 2006 in Winnipeg. Over the course of the seven meetings, the committee members received presentations from invited experts and a small number of stakeholders.

Two experts provided presentations and reports on options for energy codes and standards, a third expert delivered a presentation on successful approaches to market transformation, and three members of the Committee made formal presentations on the enforcement of building codes and standards.

The Committee received in person and/or written submissions from the following professional organizations, as stakeholders:

- Building Energy Management Manitoba
- Building Owners and Managers Association (Manitoba)
- Manitoba Building Officials Association
- Mechanical Contractors Association of Manitoba

Each of these professional organizations is supportive of the development and implementation of a commercial building energy code in Manitoba. The comments and suggestions, both general and specific, of each organization are reflected in the Committee's recommendations.

INTRODUCTION

There is evidence of strong public support for an energy code for buildings. In a national poll released in March 2006, 92% of Canadians surveyed agree Canada should phase in mandatory standards requiring all new buildings to deliver 50% more energy efficiency within 10 years.[1] The survey also revealed that government leadership is a prerequisite to Canadians taking more sustainable actions, such as improving energy efficiency in buildings.

This individual sentiment for energy efficiency mirrors a substantial national and global movement to significantly reduce energy use from the buildings sector. In September 2005, Canada's Council of Energy Ministers pledged to work together to encourage greater energy efficiency in Canada. This group of provincial energy ministers has endorsed a recommendation from the Assistant Deputy Ministers Steering Committee on Energy Efficiency to update Canada's *Model National Energy Code for Buildings*.

Also in September 2005, the Canadian Renewable Energy Alliance, called for a national energy strategy that supports achievement of the maximum potential for energy efficiency.[2] In October 2005, the American Society of Heating, Refrigerating, and Air Conditioning Engineers released its 2005-2010 research strategic plan, *Navigation for a Sustainable Future*, with a goal of providing guidance on achieving 30, 50 and 70% reductions in building energy use, and moving 70% of buildings toward net-zero energy use buildings by 2015 (net-zero energy use buildings consume equal or less energy than they produce on an annual basis).[3] In December 2005, the American Institute of Architects "adopted position statements to promote sustainable building design and resource conservation to achieve a minimum reduction of 50% of the current consumption level of fossil fuels used to construct and operate buildings by the year 2010."[4] In March, 2006, the World Business Council for Sustainable Development announced the formation of an alliance of leading global companies (starting with U.S.-based United Technologies Corp. and, France-based Lafarge Group) "to determine how buildings can be designed and constructed so that they use no energy from external power grids, are carbon neutral, and can be built and operated at fair market values."[5]

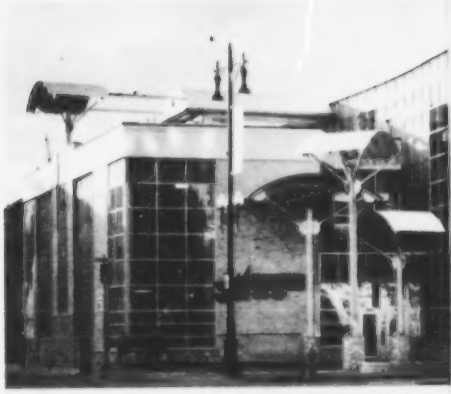
Incorporating energy efficiency standards into national and provincial building and energy codes is one of the suggested policy options to improve efficiency in Canada proposed in *Sustainability within a Generation*, published by the David Suzuki Foundation. Improving efficiency is one of nine strategies in this vision document because Canada ranks "28th out of 29 Organisation for Economic Co-operation and Development (OECD) nations in energy efficiency."[6] Energy efficiency is also a key component of *Green and Growing*, Manitoba's green strategic framework.[7]

Increasing energy efficiency in buildings can achieve multiple energy, financial, human health and environmental benefits, including: reduced energy use (including non-renewable sources), less strain on energy distribution networks due to reduced demand, lower operating costs, less exposure to higher energy costs, reduced green-

WHAT IS AN ENERGY EFFICIENT BUILDING?

than the model code requires minimal change from current design and construction practice. The building uses the same types of technologies and has many of the same types of components (e.g., insulation, windows, lighting) as a less energy efficient building. The difference? These components are better and more energy efficient (e.g., more attention to insulation and air sealing in exterior walls; use of high-performance windows; T8 in place of T12 fluorescent lighting in the ceiling). Examples pictured in this report are Sears Polo Park (p. 25) and Sobeys Grant Park (p. 37), which are 30.5% and 26.2% more energy efficient than the model energy code, respectively.

than the model code uses additional components, or new technologies, and draws on innovative (or in some cases rediscovered) architectural design principles. It will typically have lots of windows to let in natural daylight, and include solar shades or awnings to help keep the summer heat off of the building. Additional technologies may include motion sensors to turn lights on and off, carbon dioxide sensors to automatically adjust the fresh air requirements, and geothermal heating. Examples pictured in this report are the SC3 office (p. 12), the Mountain Equipment Co-op store (p. 27) and the Red River College Princess Street Campus (p. 40) which are 54.9%, 53.9%, and 48.2% more energy efficient than the model energy code, respectively.



than the model code requires additional design considerations, removing some conventional components, and adding leading edge technologies. The building is responsive to the local climate, and orientated south to fully benefit from the light and energy of the sun. The design of the building may also allow for natural ventilation, which means removing some of the mechanical systems that typically move air through the building. And the building includes leading edge technologies such as a green roof to keep the heat off of the building, or solar panels to generate electricity or to heat water. One example pictured in this report is the Manitoba Hydro new corporate headquarters (p. 53).

The Energy Code Advisory Committee is recommending Manitoba adopt the *Model National Energy Code for Buildings* (1997), with amendments prescribing a 25% improvement in energy efficiency above the current model code (i.e. Example A on the opposite page). The amendments are necessary because the model code has not been updated, since first published in 1997, to reflect new building technologies, new design and construction practices, current energy prices and construction costs, or concerns about greenhouse gas emissions. The Committee is recommending the design and construction of buildings with better and more energy efficient components, such as greater insulation, high-performance windows, and efficient lighting. The recommendations will improve occupant comfort and have little or no impact on building owners and designers already designing buildings with these better technologies.

in the building envelope (i.e., exterior walls and roof).

including warm-edge windows, windows appropriate for the building orientation, and tinted windows to control solar gain.

(Heating, Ventilation, Air-conditioning) systems.

rather than T12, in the ceiling.

T8 lighting and LED exit signs are now common in new buildings in Manitoba. An energy code will help to ensure that old T12 lighting ballasts and old exit signs are not used in new buildings.

house gas emissions, increased cash flow, increased occupant comfort, enhanced property values, and improved building design and overall building performance. An energy efficient building is a wise investment for building owners, directly improving the bottom line, and an attractive place to be for building tenants. In Manitoba, reducing energy use and peak energy demand allows Manitoba Hydro to export more electricity, and reducing greenhouse gas emissions helps Manitoba meet its climate change objectives.

BUILDING ENERGY USE IN MANITOBA

Manitoba has been a leader in establishing energy efficiency requirements for new houses. As a result of these innovative requirements, between 1989 and 2003 Manitobans benefited from an overall 19% *decrease* in natural gas use for residential heating. By contrast, there are no commercial building energy efficiency requirements, and for the same time period (1989-2003) there was an 8% *increase* in natural gas use by the commercial building sector in Manitoba.

Most of the energy used in Manitoba is imported non-renewable fossil fuels. In 2003, Manitoba's energy expenditures totalled $2.8 billion. About 70% of this total, or $2 billion, was spent on imported energy, mostly for transportation and buildings. Also according to 2003 data, 64% of energy use in Manitoba commercial buildings is for space heating, and of the different types of energy (e.g., natural gas; electricity) used by commercial buildings in Manitoba, 62% is natural gas.

Given the global outlook on energy, it is clear that some forms of energy will become more scarce and some energy prices will rise over time. This is true of natural gas. Current plans to build liquid natural gas (LNG) ports in Canada to accept natural gas from Russia is an indicator of the future exhaustion of Canadian supplies. Although opening an LNG terminal in Canada will relieve supply pricing pressures, transporting natural gas from Russia will be more expensive than piping it from Alberta.

An energy code is an insurance policy for the public. It will help to ensure that future generations of Manitobans can afford to occupy buildings we build today. The intent is to help create buildings that are functional, affordable, and preserve Manitoba's resources for all into the future. One of the keys to success is to incorporate efficiency requirements early in the life of a building.

It is generally more economical to incorporate energy efficiency improvements during the construction of a building. For example, it is easier to add insulation to the wall of a building during the initial construction of the wall, than to insulate the wall at a later date. Similarly, the earlier energy efficiency is considered during the building design phase, the more economical it is to incorporate energy efficiency into the final design, and into the eventual construction and operation, of the building.

For energy efficiency to become mainstream in Manitoba, it will need to be profitable for the building industry. It is for this reason that incentives, to help shorten the payback period of investments in energy efficiency, are so important.

BUILDING ENERGY EFFICIENCY REQUIREMENTS WORLDWIDE

Energy efficiency requirements for new buildings are common practice in countries around the world. This section provides a snapshot of these requirements in the European Union, China, United States, and Canada.

As of January 2006, the European Union requires Member States to implement the *Directive on the Energy Performance of Buildings*.[8] The principal objectives of the Directive are to promote the improvement of the energy performance of buildings within the EU through cost effective measures, and to promote the convergence of building standards towards those of Member States which already have ambitious levels. This Directive requires:

- the application of minimum requirements to the energy performance of new buildings;
- the application of minimum requirements to the energy performance of large existing buildings that are subject to major renovation;
- energy certification of buildings; and
- regular inspection of boilers and air-conditioning systems in buildings, and in addition, an assessment of the heating installation in which the boilers are more than 15 years old.

In the United Kingdom, new measures to make buildings more energy efficient came into effect in April 2006.[9] The Building Regulations were amended to improve thermal efficiency standards of new residential and non-residential buildings by up to 40% compared to 2002 levels by limiting heat gains and losses in buildings. In addition, there will be stricter controls of a number of features such as the air-tightness of buildings, heating and hot water systems, and mechanical ventilation. Other considerations such as building orientation, window size limitations and integrated building shades to reduce the effects of high internal temperatures due to the sun's effect on buildings are also addressed.

Where appropriate, the new Building Regulations will actively promote the use of low or zero carbon energy supply systems such as solar hot water, photovoltaic power, biofuels (e.g., wood fuels and oil blends), community, dwelling or block-based combined heat and power sources, and the use of heat pumps.

In China, the government announced an ambitious goal in February 2005 to transform all existing buildings into energy-saving buildings by 2020. In April 2005, China approved and announced the first comprehensive national code that promotes the energy-efficient design of commercial buildings. This building code will

apply to the energy-efficient design of new and renovated commercial buildings. Also, in addition to establishing national green building standards, China is requiring that all new buildings built after 2005 incorporate design innovations and technologies that could save up to 65% in energy use per square meter.[10]

In the United States, 48 States, including both states that border Manitoba (North Dakota and Minnesota), have a commercial building energy efficiency code.[11] Almost all states adopt or reference either the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) *Standard 90.1* or the *International Energy Conservation Code*. The U.S. Department of Energy, through the Office of Energy Efficiency and Renewable Energy's Building Technologies Program, works closely with the building industry to promote energy efficiency and works with state and local regulatory groups to improve building codes.

In Canada, the development of energy efficiency standards dates back to 1976 with the work of the Standing Committee on Energy Conservation in Buildings. In 1990, the Canadian Commission on Building and Fire Codes began work on the *Model National Energy Code for Buildings*, which was published in 1997. Only Ontario's Building Code currently references the model code, as an alternative to the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) *Standard 90.1*. At the time of the preparation of this report, there is interest among many of the provinces in establishing energy efficiency requirements, and working together to secure support for the update of the *Model National Energy Code for Buildings*, under the auspices of the Building Energy Code Collaborative with the help of Natural Resources Canada.

A CHOICE OF BUILDING ENERGY EFFICIENCY STANDARDS

The overall objective of building energy efficiency standards is to require that buildings use less energy. They provide requirements for increasing the energy efficiency of the building envelope; lighting; heating, ventilating and air-conditioning systems; domestic hot water systems; and electrical power. Typically, designers can follow a prescriptive path, meaning that a building design must meet a list of prescribed requirements, or a performance path, which requires that the building design perform to a level of energy efficiency no less than if the building was designed to meet the prescriptive requirements.

The Energy Code Advisory Committee considered two different, both well established, commercial building energy standards: (1) Canada's *Model National Energy Code for Buildings*, and (2) the American Society of Heating, Refrigeration and Air Conditioning Engineers (ASHRAE) *Standard 90.1 - Energy Standard for Buildings Except Low-Rise Residential Buildings*.

The *Model National Energy Code for Buildings* was published in 1997 by the Canadian Commission on Building and Fire Codes. Although many provinces (including Manitoba) helped to fund the development of the *Model National Energy Code for Buildings*, it is currently referenced only by the Province of Ontario. Today, it is the basis for Natural Resources Canada's voluntary Commercial Building Incentive Program (CBIP), which provides a financial incentive to new buildings that are at least 25% more energy efficient than the model code. According to Natural Resources Canada, CBIP buildings completed so far are, on average, about 36% more energy efficient than the model code. The projected average annual energy savings, per building, is $47,188 and the average

annual greenhouse gas savings are 244 tonnes per building. Currently, Manitoba has 23 CBIP buildings. By comparison, Saskatchewan, with a slightly smaller population, has over twice as many CBIP buildings. The model code is also the basis for the LEED® Canada-NC Green Building Rating System administered by the Canada Green Building Council, and Manitoba Hydro's Power Smart Design Standards for commercial buildings.

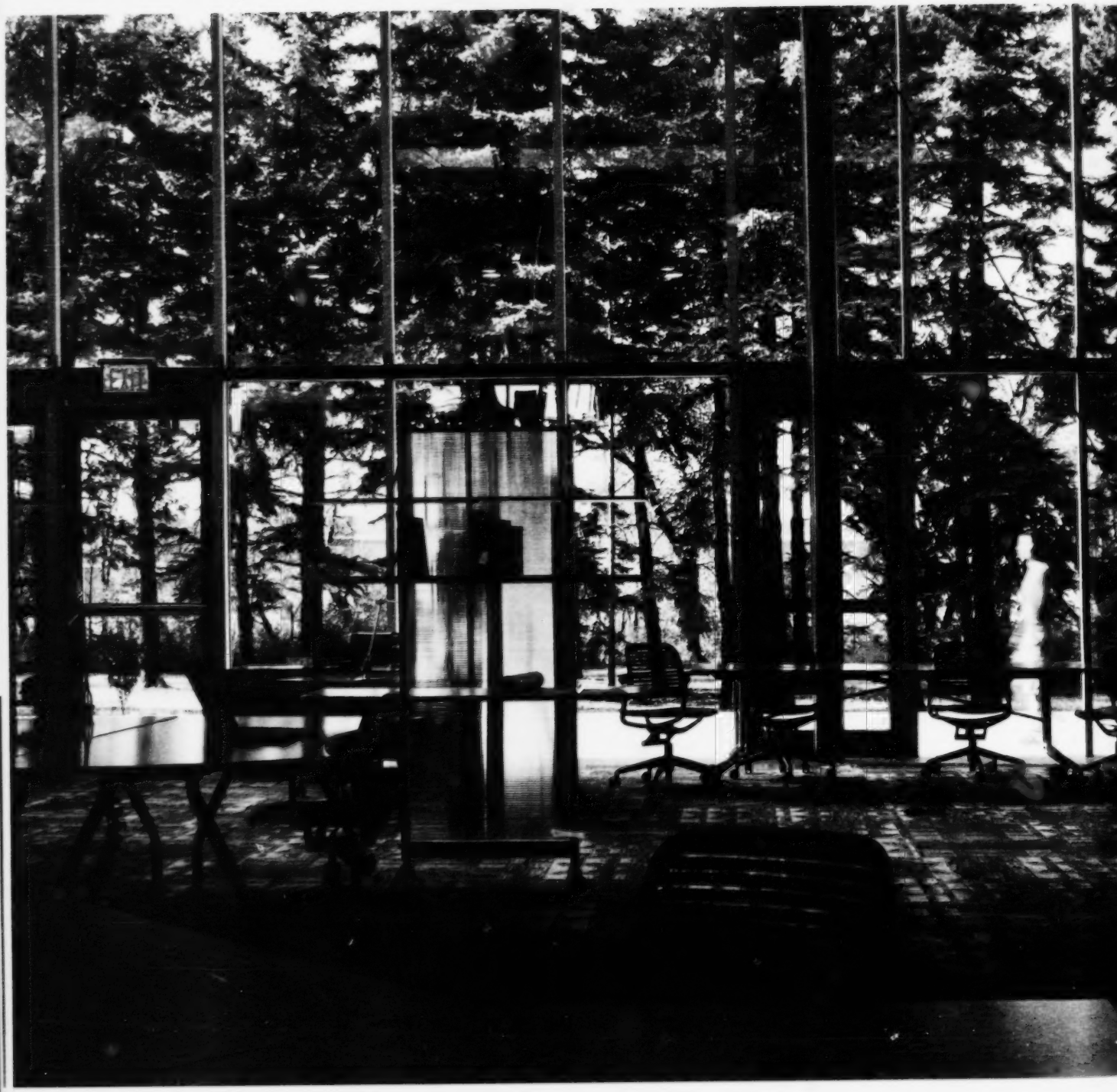
The American Society of Heating, Refrigeration and Air-Conditioning Engineers *Standard 90.1* is a widely accepted and widely used standard for building energy efficiency. It is the basis for the LEED® Green Building Rating System in the United States. There is a long history of ASHRAE providing consensus standards referenced or quoted in national model codes and ultimately adopted by code jurisdictions throughout North America. *Standard 90.1* is referenced in the United States *Energy Policy Act* as the reference standard for state energy codes, and was used as the basis for the *Model National Energy Code for Buildings* (1997).

CONSENSUS, COLLABORATION, INTEGRATION

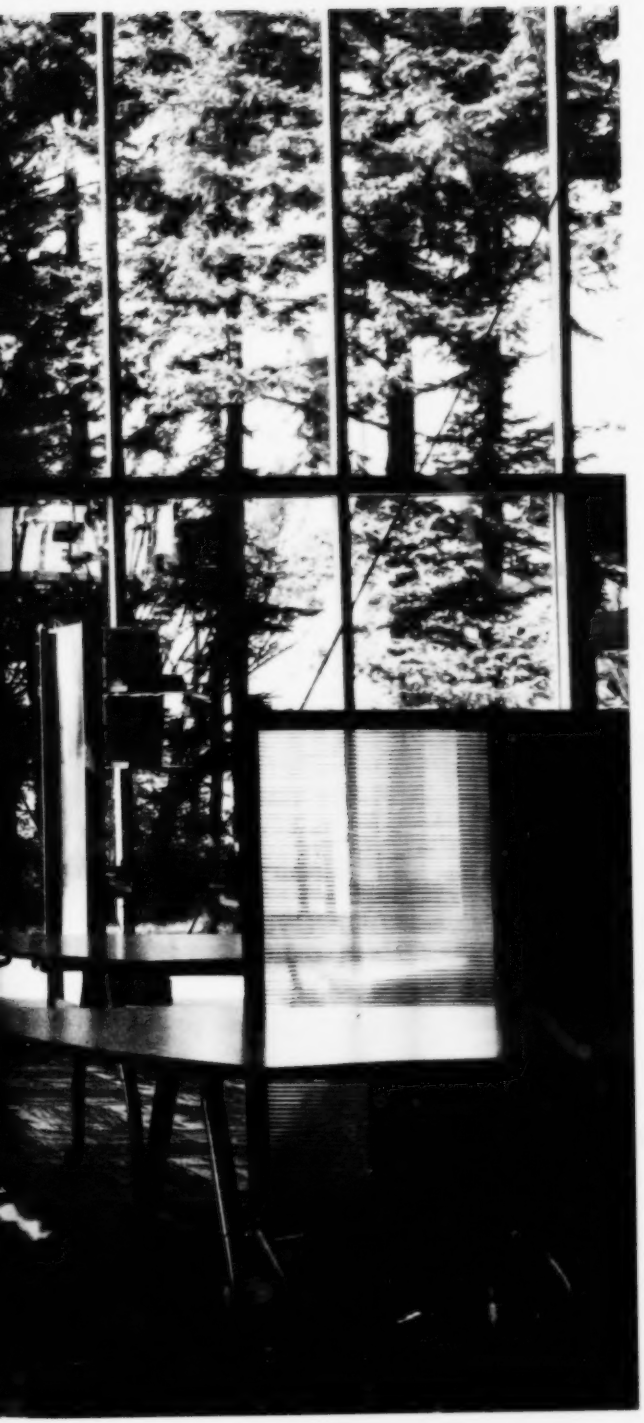
The recommendations in this document were prepared using a consensus decision-making process. Each of the 17 recommendations are the result of respectful dialogue and deliberation amongst the members of the Energy Code Advisory Committee; the result of close collaboration amongst the group, who's members represented perspectives that span the Manitoba commercial building industry.

In a similar vein, the recommendations contained in these pages promote collaboration between a number of different organizations and integration of multiple perspectives and activities. One example is the partnership encouraged between Manitoba Labour and Immigration, Manitoba Energy, Science and Technology, and Manitoba Hydro. The recommendations recognize that Manitoba Labour and Immigration holds the legislated authority for building standards, that Manitoba Energy, Science and Technology holds the legislated authority for energy, and that Manitoba Hydro is interested in increasing energy efficiency in buildings. Thus, in Manitoba, success with an energy code for commercial buildings requires the collaboration of these entities, along with private industry.

Success also requires integration of perspectives during the development of the energy code. For this reason the Committee suggests the energy code be developed by a multi-stakeholder energy code task group of the Manitoba Building Standards Board. Success also requires integration of activities between, for example, Natural Resources Canada, Manitoba Energy, Science and Technology, the Office of the Fire Commissioner, Manitoba Hydro, many professional associations, and academic institutions. Each organization has resources, expertise, and a unique perspective that must be brought to this endeavour. These collaborative and integrated approaches will maximize efficiencies and reduce redundancies, resulting in the successful development and implementation of a commercial building energy code in Manitoba.



Interior view of SC3 office. Image supplied by Smith Carter Architects and Engineers Inc.. Copyright Gerry Kopelow.



COMMITTEE RECOMMENDATIONS

CODE ADOPTION RECOMMENDATIONS

This section contains Recommendations 1 to 5, for the adoption of a commercial building energy code in Manitoba.

RECOMMENDATION 01

Adopt an energy code for all new commercial construction in Manitoba

The Committee supports and endorses adopting an energy code for all *new commercial construction* in Manitoba. The Committee defines new commercial construction as the construction of new commercial buildings, new additions to existing commercial buildings, and major renovation of existing commercial buildings.

This recommendation applies to the same buildings covered by the *Model National Energy Code for Buildings (1997)*. The Code covers all buildings, except:

- buildings of 3 storeys or less in building height, having a building area not exceeding 600 square meters and containing only dwelling units, related ancillary service rooms, shared means of egress or garages servicing the units;
- buildings of residential occupancy containing not more than one dwelling unit;
- buildings less than 10 square meters in building area;
- farm buildings (i.e., non-residential buildings located on land devoted to farming, and used for the housing of equipment or livestock, or the production, storage or processing of agricultural produce or feeds); and
- buildings exempt by the Authority Having Jurisdiction, where it can be shown that the nature or duration of the occupancy makes it impractical to apply the requirements.

INTENT

To recommend the adoption of cost effective minimum mandatory requirements for energy efficiency in Manitoba buildings.

RATIONALE

The Manitoba market is already designing and constructing many new commercial buildings that are more energy efficient. A range of examples of new buildings achieving higher levels of energy efficiency in both the public and private sectors include: Sears Polo Park, Sobeys Grant Park, Red River College Princess Street Campus, Manitoba Public Insurance Claims Centre (Winkler), Smith Carter Architects and Engineers office, Westman Recycling Facility, Shindico Realty office, Gimli Community Health Centre, Mountain Equipment Co-op Retail Store, and The Russell Inn.

In September 2005, the Minister of Energy, Science and Technology appointed 15 Manitobans to the Energy Code Advisory Committee. The Committee was asked to provide advice on the adoption, development, and implementation of an energy code for new commercial construction in Manitoba.

The Committee received written support for the introduction of a commercial building energy code in Manitoba from the following organizations: Building Energy Management Manitoba; the Building Owners and Managers Association (Manitoba), the Manitoba Building Officials Association; and the Mechanical Contractors Association of Manitoba. These associations represent hundreds of Manitoba professionals, from building owners, design professionals, contractors, to building code enforcement officials.

The Province of Manitoba, through Manitoba Energy, Science and Technology, seeks to encourage the sustainable and efficient use of energy and other resources to decrease Manitoba's dependence on imported non-renewable resources and increase our ability to export hydro-generated electricity.

The Manitoba Climate Change Task Force, in its 2001 report titled *Manitoba and Climate Change: Investing in Our Future*, recommended that the Government of Manitoba require all new buildings to achieve energy targets 25% above the *Model National Energy Code for Buildings*.

Manitoba Hydro, through its Power Smart for Business program, has helped to move the Manitoba commercial building market toward energy efficiency. As a result of these efforts, and the natural adoption of new technologies, some energy efficiency technologies (e.g., energy efficient lighting) have become standard features in all new commercial buildings in Manitoba.

The Public Utilities Board has ordered Centra Gas, a wholly-owned subsidiary of Manitoba Hydro, to take steps to enhance space heat retention and heating efficiency for reasons related to consumer cost, the environment and gas system viability.

Adopting a commercial building energy code in Manitoba will:

- Assist the commercial building industry in continuing to build cost-effective buildings, and help the industry compete nationally and internationally by working with requirements that exist in other Canadian and U.S. jurisdictions.
- Increase building energy efficiency, reduce energy use, and reduce peak demand, allowing Manitoba to increase exports of renewable electricity and reduce dependence on imports of non-renewable energy sources (e.g., natural gas).
- Reduce greenhouse gas emissions from Manitoba's commercial building sector.
- Improve the quality of indoor environments for occupants and users of commercial buildings, thereby increasing productivity and improving human health.
- Encourage the expanded use of renewable energy sources and energy systems in Manitoba's building sector.
- Support Manitoba's objectives for economic development and environmental sustainability.

The remaining recommendations are all designed to support this first recommendation.

RECOMMENDATION 02

Adopt the *Model National Energy Code for Buildings*.

The Committee recommends adopting the *Model National Energy Code for Buildings*, considering the following schedule:

- As early as possible, a joint Ministerial announcement between Manitoba Energy, Science and Technology, and Manitoba Labour encouraging industry to voluntarily use the *Model National Energy Code for Buildings* (1997) and to prepare for the future adoption, in 2008, of the *Model National Energy Code for Buildings* (1997) in Manitoba.
- Adoption of the *Model National Energy Code for Buildings* (1997) as the energy code for buildings in Manitoba by January 1, 2009.
- Development and adoption of Manitoba Amendments, prepared by an Energy Code Task Group of the Manitoba Building Standards Board, by January 1, 2009.

INTENT

To adopt a Canadian building energy code in a staged process, to allow for ease of adoption, and to be consistent with other provincial/territorial jurisdictions in Canada.

RATIONALE

1. The *Model National Energy Code for Buildings* is a code developed in Canada, for use by professionals in Canada, including representatives of provincial and territorial governments. The *Model National Energy Code for Buildings* is also the basis for other programs, such as the Commercial Building Incentive Program offered by Natural Resources Canada, the Canadian version of the LEED® Green Building Rating System administered by the Canada Green Building Council, and Manitoba Hydro's Power Smart Design Standards for commercial buildings. The other available standard for building energy efficiency is the American Society of Heating, Refrigerating, and Air Conditioning Engineers (ASHRAE) Standard 90.1. Standard 90.1 is a good standard and is used in Canada. However, Canadians have little influence over the development of Standard 90.1., whereas they have the ability to participate in and influence future revisions to the *Model National Energy Code for Buildings*.

2. Along with Manitoba, the provinces of British Columbia, Saskatchewan, Ontario, and Québec have expressed interest in working with Natural Resources Canada to secure support for the update of the 1997 version of the *Model National Energy Code for Buildings* through the code development process managed by the Canadian Commission on Building and Fire Codes.

3. The Building Owners and Managers Association (Manitoba), who's members represent 80% of the existing commercial office space in Winnipeg, supports the introduction of a provincial energy code that exceeds the current *Model National Energy Code for Buildings*, and suggests the energy code be implemented in phases to mitigate the impact on the local market.

4. The Manitoba Building Officials Association favours the adoption of a national document, in order to coordinate code enforcement and application practices across the country.

Exterior rendering of The Strand, image supplied by Prairie Total Architects

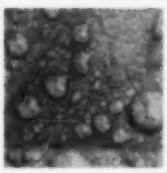
BENEFITS

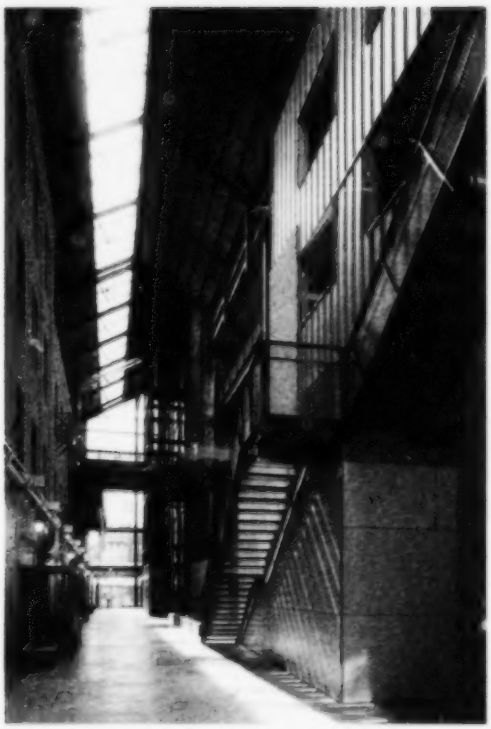
The benefits of adopting the *Model National Energy Code for Buildings*, assuming several other provincial and territorial jurisdictions adopt an updated Code, include:

- Building developers, building owners, contractors, and product suppliers will have consistent requirements for energy efficiency in new commercial construction across Canada.
- Building design professionals (e.g., architects, engineers) based in Manitoba can more readily apply their knowledge and expertise outside Manitoba.
- Building regulators and code officials in smaller jurisdictions, such as Manitoba, can adapt implementation and training resources developed by or with other jurisdictions.

RECOMMENDATION 03

Adopt the *Model National Energy Code for Buildings* as a regulation under *The Buildings and Mobile Homes Act* by January 1, 2009





The Committee recommends adopting the *Model National Energy Code for Buildings* as a regulation under *The Buildings and Mobile Homes Act*, by January 1, 2009.

INTENT

To align the adoption and implementation of the energy code for commercial buildings with the adoption and implementation of all other building codes and standards in Manitoba.

RATIONALE

1. Although *The Energy Act* allows for the making of regulations "prescribing codes or standards to apply in the province or a part of the province respecting the efficient use of energy in the design, construction, alteration, operation, and maintenance of buildings," *The Buildings and Mobile Homes Act* contains a clause invalidating any other construction standards not adopted, established, or prescribed under *The Buildings and Mobile Homes Act*.

2. The Manitoba Building Officials Association prefers changes to *The Buildings and Mobile Homes Act*, over changes to *The Energy Act*, in order to adopt an energy code for commercial buildings.

3. The *Model National Energy Code for Buildings* is intended to be used in conjunction with the *National Building Code*, which is adopted as the building code in Manitoba under *The Buildings and Mobile Homes Act*.

BENEFITS

As a result of this recommendation:

- All codes and standards for buildings in Manitoba remain under one Act, creating consistency for code users, policy makers, regulators, and building officials.
- Developers, building owners, designers, and contractors can interact with the same approval channels for the energy code as for all other building codes, creating an opportunity for a one-stop approval process.

Interior view of Red River College Princess Street Campus. Image supplied by Cohlmeyer Architects. Copyright Barry Kopelow

- Future generations of code users can more readily integrate energy efficiency, and other resource efficiency, measures as components directly into the building code, if desired.

COMMENTARY

During our meetings, the Committee learned of the current human and financial resource constraints of building regulators and code enforcement officials. Although the intent of this recommendation is to align the adoption and enforcement of an energy code for buildings with the adoption and enforcement of all other building codes and standards, it is not our intent to place further strain on existing human and financial resources in the regulatory and code enforcement communities. For this reason, in subsequent recommendations, we recommend: (a) the Department responsible for *The Energy Act* assist the Department responsible for *The Buildings and Mobile Homes Act* with the development and implementation of the energy code; (b) the use of acceptance testing for code compliance to help ensure that key building elements perform as designed; and (c) registered building design professionals be allowed to assure compliance with the energy code, receiving provincial approval at the plan examination stage.

The Recommended Actions to the right offer specific recommendations for amendments to *The Buildings and Mobile Homes Act*, and suggested items to include in a regulation adopting the *Model National Energy Code for Buildings*.

RECOMMENDED ACTIONS

RECOMMENDATION 04

Amend *The Energy Act* to provide support for adopting the *Model National Energy Code for Buildings* under *The Buildings and Mobile Homes Act*.

The Committee recommends amending *The Energy Act* to provide support for the adoption of the *Model National Energy Code for Buildings* under *The Buildings and Mobile Homes Act*.

INTENT

To ensure continued support in a consistent manner to the Department responsible for *The Buildings and Mobile Homes Act* (currently Manitoba Labour and Immigration) by the Department responsible for *The Energy Act* (currently Manitoba Energy, Science and Technology).

RATIONALE

1. The Department responsible for buildings and the Department responsible for energy are not one and the same. Manitoba Labour and Immigration, the Department responsible for buildings, adopts, under *The Buildings and Mobile Homes Act*, the *National Building Code of Canada*. All requirements in the *National Building Code* address one of four top-level objectives: safety, health, accessibility for persons with disabilities, and fire and structural protection of buildings. Energy efficiency is not an objective of the *National Building Code* but, instead, it is addressed by the *Model National Energy Code for Buildings*, which Manitoba Energy, Science and Technology, the Department responsible for energy, is interested in adopting.

2. Recommendation 3 describes the rationale for and the benefits of adopting the *Model National Energy Code for Buildings* under *The Buildings and Mobile Homes Act*.

3. The commentary in Recommendation 3 describes the human and financial resource constraints of building regulators and code enforcement officials, which includes those in the Department responsible for buildings.

BENEFITS

As a result of this recommendation:

- The Department most interested in establishing an energy code can help ensure this is achieved by providing support to the Department having legislated authority for building codes and standards in Manitoba.
- Manitoba Energy, Science and Technology can officially remain engaged in the development and implementation of the energy code.
- Manitoba Labour and Immigration and the Office of the Fire Commissioner can carry out this new initiative without having to disrupt the current allocation of human and financial resources.

RECOMMENDED ACTIONS

The Committee recommends amending *The Energy Act* to:

1. Add a fourteenth item to the "functions of the minister" to provide support for the adoption, management, and implementation of the *Model National Energy Code for Buildings* by the Department responsible for *The Buildings and Mobile Homes Act*.

2. Add a fourteenth item to the "functions of the department" to provide technical support to the Energy Code Task Group of the Manitoba Building Standards Board.

The Committee recommends that the energy code be adopted as a component of a broad, comprehensive strategy to ensure market transformation of energy efficient measures in commercial building construction practices.

INTENT

To ensure that the energy code is recognized as one of three important components to achieving the objective of energy efficiency in commercial building construction.

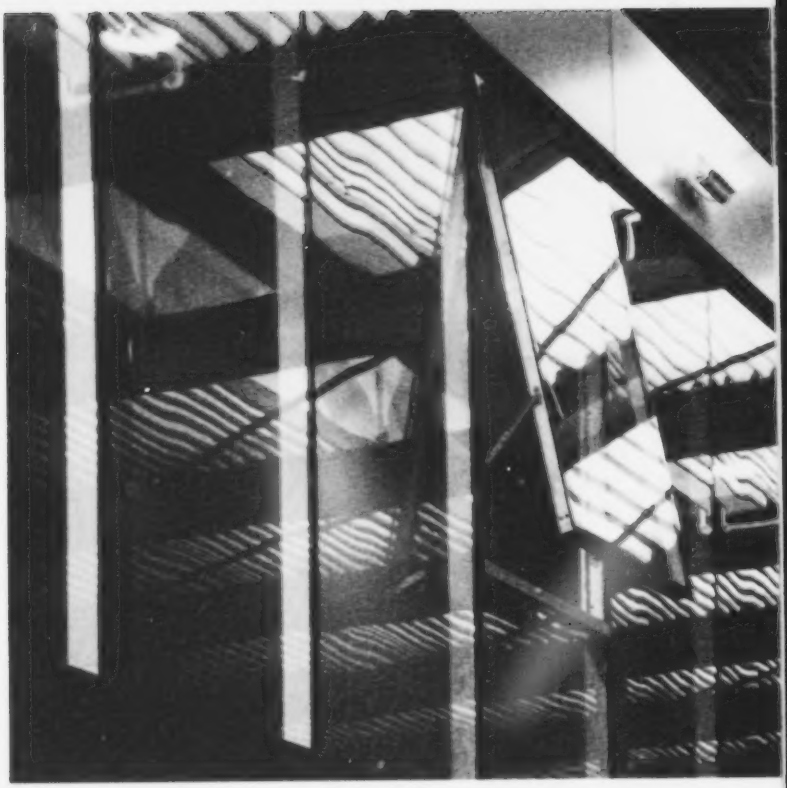
RATIONALE

Successful market transformation to energy efficient buildings is best achieved with a strategy that includes three components:

1. Energy efficiency research, development, and demonstration (e.g., market leading buildings such as the new Red River College Princess Street Campus, the new Manitoba Hydro headquarters, the new Winnipeg Humane Society building, the Winnipeg International Airport site redevelopment, and the Mountain Equipment Co-op Store in Winnipeg, and the new town hall in Gladstone, Manitoba).
2. Financial incentives for energy efficient products and practices (e.g., a Power Smart Program).
3. Energy efficiency requirements (e.g., an energy code).

In addition to adopting the *Model National Energy Code for Buildings*, the Committee recommends:

- Natural Resources Canada continue to offer the Commercial Building Incentive Program.
- Manitoba Hydro (a) continue to offer commercial building financial incentives for energy efficiency measures through its Power Smart Program, and (b) advance its Power Smart Program requirements as new commercial construction becomes more energy efficient.
- Manitoba Energy, Science and Technology, and Manitoba Hydro, allocate resources to building research, development, and demonstration to advance commercial building energy efficiency in Manitoba.



Exterior rendering of Assiniboine Credit Union Rivergrove Branch. Image supplied by Northern Sky Architecture Inc.

COMMITTEE RECOMMENDATIONS

CODE DEVELOPMENT RECOMMENDATIONS

This section contains Recommendations 6 to 11, for the development of a commercial building energy code in Manitoba.

RECOMMENDATION 06:

Appoint a representative of a Manitoba organization with a focus on energy efficiency to the Manitoba Building Standards Board in 2006.

The Committee recommends the Lieutenant Governor in Council appoint a representative of a Manitoba organization with a focus on energy efficiency to the Manitoba Building Standards Board in 2006. The Committee recommends the following three organizations (listed alphabetically) each be asked to identify one suitable candidate for this new position on the Board: ASHRAE (American Society of Heating, Refrigerating, and Air Conditioning Engineers) Manitoba; Building Energy Management Manitoba; and Manitoba Chapter, Canada Green Building Council.

INTENT

To add a commercial building energy efficiency expert to the Manitoba Building Standards Board.

RATIONALE

The Manitoba Building Standards Board provides advice to the Minister of Labour and Immigration and to the Fire Commissioner on the Manitoba Building, Fire, and Plumbing Codes. The Board consists of professionals representing key stakeholder groups concerned with building construction, building standards, and fire safety. With the energy code adopted as a regulation under *The Buildings and Mobile Homes Act* it would be advantageous to add a commercial building energy efficiency expert to the Manitoba Building Standards Board to advise the Minister of Labour and Immigration and the Fire Commissioner, and fellow Board members, on building energy issues. ASHRAE Manitoba is an organization that brings together industry professionals, academics, and students to meet, discuss, and learn about the heating, ventilation, air conditioning, and refrigeration sciences in the Manitoba and North-western Ontario region. Building Energy Management Manitoba is an organization dedicated to promoting energy efficiency and energy management in the Manitoba commercial building sector. The Manitoba Chapter, Canada Green Building Council is an organization promoting green building, including energy efficiency, in Manitoba. The Canada Green Building Council's LEED® Green Building Rating System references the *Model National Energy Code for Buildings* in its energy efficiency requirements.

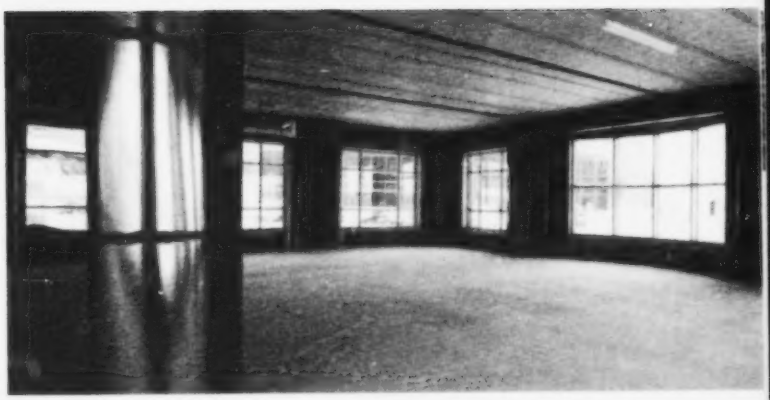
BENEFITS

This recommendation:

- Establishes a commercial building energy efficiency resource for the Minister of Labour and the Fire Commissioner, as well as other members of the Manitoba Building Standards Board.
- Provides a voice on the Manitoba Building Standards Board for members of one of the three Manitoba organizations promoting commercial building energy efficiency, and other building professionals interested in energy efficiency.
- Ensures that a commercial building energy code will be developed and implemented in accordance with other building codes and standards.

RECOMMENDATION 07

The Committee recommends the Manitoba Building Standards Board establish a multi-stakeholder Energy Code Task Group in 2007. The Committee also recommends that the Task Group receive Secretariat support from Manitoba Energy, Science and Technology.



INTENT

To create a forum for the development of the energy code and to support the forum with resources from the Department primarily interested in its activities.

RATIONALE

A group of professionals with the appropriate breadth and depth of expertise must be brought together, and provided with the appropriate support, to develop the technical requirements of the energy code. The Manitoba Building Standards Board is comprised of professionals who are leaders in their field, however additional expertise, not on the Board, is needed for the development of the energy code. Establishing a task group provides an opportunity to bring together a group of building energy efficiency experts, thereby ensuring sound and solid advice to the Board. Providing resources from Manitoba Energy, Science and Technology to the Energy Task Group allows Manitoba Labour and Immigration and the Office of the Fire Commissioner to maintain the resources it has already allocated to current activities of the Manitoba Building Standards Board.

The Committee recommends the Energy Code Task Group:

1. Review and provide comments on the Terms of Reference for the studies identified in Recommendation 8.

2. Work with Natural Resources Canada to develop the Manitoba Amendments to the *Model National Energy Code for Buildings* (1997) – see Recommendation 9.

3. Host multi-stakeholder dialogues, both in person and electronic, to engage private, public, and non-profit sector stakeholders from across Manitoba in discussions about the development of the energy code.

4. Participate, with other stakeholders, in a Standing Committee of the Canadian Commission on Building and Fire Codes to update the *Model National Energy Code for Buildings* (1997) – see Recommendation 10.

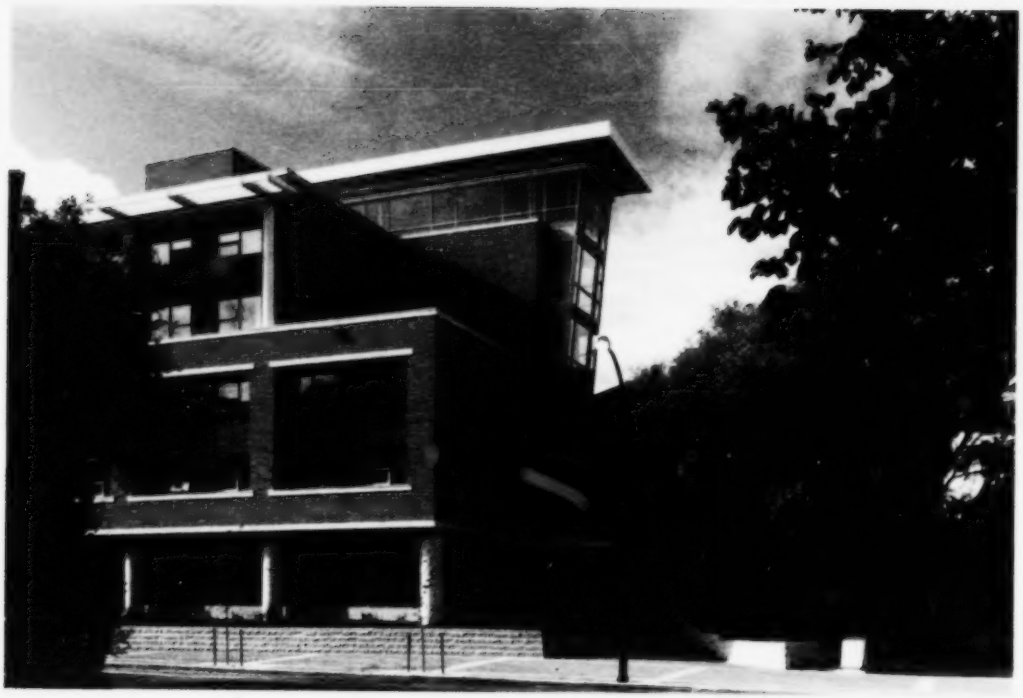
To the right are Recommended Actions for establishing the Energy Code Task Group.

RECOMMENDED ACTIONS

Interior view of Mountain Equipment Co-op store. Image supplied by Prairie Architects Inc. Copyright Gerry Kopelow

RECOMMENDATION 08.

Commission a series of studies to better understand market impacts.



The Committee is aware that Manitoba Hydro is currently working on a New Construction Baseline Study to better understand current energy efficiency construction practices in Manitoba. The Committee recommends also undertaking the following studies prior to or during the development of the energy code:

- An Economic Impact Study, to understand the economic impact on the Manitoba market of implementing, and complying with, the energy code as proposed. This study should include a life-cycle economic assessment of: (1) adopting a level of building energy efficiency at least 15% better than the *Model National Energy Code for Buildings* (1997), and (2) adopting a level of building energy efficiency at least 25% better than the *Model National Energy Code for Buildings* (1997).
- A Market Capacity Study and Training Needs Analysis, to assess the current capacity of Manitoba building design and construction professionals to respond to an energy code, and to better understand their training needs.
- A Building Authority Impact Study, to better understand the impact on the Authorities Having Jurisdiction over the enforcement of building codes.

Exterior view of Arthur V. Mauro Student Residence, University of Manitoba. Image supplied by LM Architectural Group. Stubbinvision Photography.

- An Energy Efficiency Technical and Market Study, to determine the energy efficient technologies available for market transformation, and to identify the technologies required in an energy code.

INTENT

To better understand the impact of a commercial building energy code in Manitoba.

RATIONALE

Before the energy code is implemented, and while it is being developed, it is necessary to understand the impact the Code will have on the market, the capacity of the market (both the capacity of professionals and the availability of technologies) to meet the new requirements, and what resources are required (including where and in what amounts) for successful implementation.

BENEFITS

This recommendation will help:

- The Province of Manitoba, Manitoba Hydro, the Manitoba commercial building industry, and other stakeholders, understand the economic impact of adopting the energy code, including the economic value of energy savings and greenhouse gas reductions.
- The Energy Code Task Group of the Manitoba Building Standards Board agree upon and recommend the most appropriate level of building energy efficiency (e.g., 15% or 25%) beyond the *Model National Energy Code for Buildings* (1997) for the Manitoba Amendments, and prescribe energy efficient technologies that are readily available in the market.
- Natural Resources Canada, Manitoba Energy, Science and Technology, Manitoba Hydro, Universities and Colleges, and professional associations effectively target and coordinate resources to support the implementation of the energy code and help build industry capacity to transform the market.

The Committee recommends all three levels of government and Manitoba Hydro participate in the studies. By *participate*, the Committee means contributing financial and human resources, providing advice (e.g., during the development of the Terms of Reference for each study), or a combination of all three.

Energy efficient technologies for buildings are often available in all markets throughout Canada. For this reason, the Committee recommends the authors of the studies speak with and gather information from provincial and state jurisdictions that have or are developing energy codes, as well as agencies or organizations that offer commercial building energy efficiency (i.e., demand-side management) programs. This information will help the report users (e.g., the Energy Code Task Group of the Manitoba Building Standards Board; Manitoba Energy, Science and Technology, and Manitoba Hydro) ensure national consistency and economies of scale for the development and implementation of the energy code.

RECOMMENDATION 09:

Develop and adopt Manitoba Amendments to the *Model National Energy Code for Buildings* (1997) by January 1, 2009.

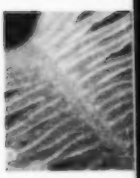
The Committee recommends developing and adopting Manitoba Amendments, with additional scope and additional energy efficiency requirements, to the *Model National Energy Code for Buildings* (1997) by January 1, 2009. To develop the Manitoba Amendments the Committee recommends:

- The new Energy Code Task Group of the Manitoba Building Standards Board work with Natural Resources Canada to prepare the Amendments.
- The new Energy Code Task Group of the Manitoba Building Standards Board consider the comments from the public review (see Recommendation 13) of the Energy Code Advisory Committee recommendations when preparing the Amendments.
- The Amendments allow for the application of the energy code to the major renovation of existing buildings. By *major renovation*, the Committee means instances where an owner wishes to rehabilitate a building or change its use, or where the economics of new construction apply. In the case of historic buildings, the Amendments should not conflict with the *Standards and Guidelines for the Conservation of Historic Places in Canada*.
- The Amendments provide prescriptive requirements for the building envelope, HVAC (Heating, Ventilation, Air Condition-ing), lighting, and service water heating systems (e.g., domestic hot water) to achieve a level of building energy efficiency 25% better than *Model National Energy Code for Buildings* (1997).
- The Amendments allow for performance-based requirements as an alternative to prescriptive requirements to achieve a level of building energy efficiency 25% better than the *Model National Energy Code for Buildings* (1997).

To confirm that 25% better than *Model National Energy Code for Buildings* (1997) is a realistic level of building energy efficiency, relative to current market conditions in Manitoba, the Committee recommends the Energy Code Task Group of the Manitoba Building Standards Board: (1) wait for the results of the Economic Impact Study (Recommendation 8), and (2) consider the results of the New Construction Baseline Study commissioned by Manitoba Hydro (due in December 2006). If the New Construction Baseline Study indicates that buildings in Manitoba are already achieving levels of energy efficiency 10% or better than the *Model National Energy Code for Buildings* (1997), and the economic impact study demonstrates it is economically viable, this recommendation stands. If these two conditions are not met, the Committee recommends the Manitoba Amendments require a level of building energy efficiency a minimum 15% better than the *Model National Energy Code for Buildings* (1997).

INTENT

To expand the scope of the model code to include major renovation of existing buildings; to establish additional energy efficiency measures while the *Model National Energy Code for Buildings* (1997) is being updated; and to help the market prepare for the future adoption of an updated *Model National Energy Code for Buildings*.



RATIONALE

The current *Model National Energy Code for Buildings* (1997) generally does not apply to the renovation of existing buildings. Manitoba, relative to other jurisdictions, has an older building stock and limited new commercial construction activity. As a result of these factors, there are proportionally larger opportunities in Manitoba to apply an energy code to new commercial construction if the requirements also apply to major renovation of existing buildings, in instances where the building is rehabilitated, or there is a change of use, or both (e.g., rehabilitation of a 1900's era warehouse building and conversion of the building to office or residential use). Typically, these instances result in the reuse of the building shell and require the installation of new insulation, new windows, and new heating and lighting systems.

The current *Model National Energy Code for Buildings* was published in 1997. The model code is out of date as a result of advancements in building design, changes in energy prices, and improvements in technologies, such as new, more energy efficient lighting which has broad market acceptance in Manitoba.

The Building Owners and Managers Association (Manitoba), who's members represent 80% of the existing commercial office space in Winnipeg, supports the introduction of a provincial energy code that exceeds the current *Model National Energy Code for Buildings*.

According to Natural Resources Canada, even new commercial buildings not striving to be energy efficient *per se* are achieving a level of energy efficiency on average 10% better than the *Model National Energy Code for Buildings*. The market is surpassing the current model code.

There is a national process underway to secure support for the update of the *Model National Energy Code for Buildings*. The earliest potential publication date of an updated model code is 2012. The Committee feels this is too long to wait for building energy efficiency requirements in Manitoba beyond those in the current model code.

Achieving higher levels of energy efficiency is entirely possible. For example, the average building participating in Natural Resources Canada's Commercial Building Incentive Program is 35% more energy efficient than the requirements in the *Model National Energy Code for Buildings*, even though the Commercial Building Incentive Program only requires a 25% improvement.

Exterior view of Shoppers Realty Inc., office image supplied by Manitoba Hydro

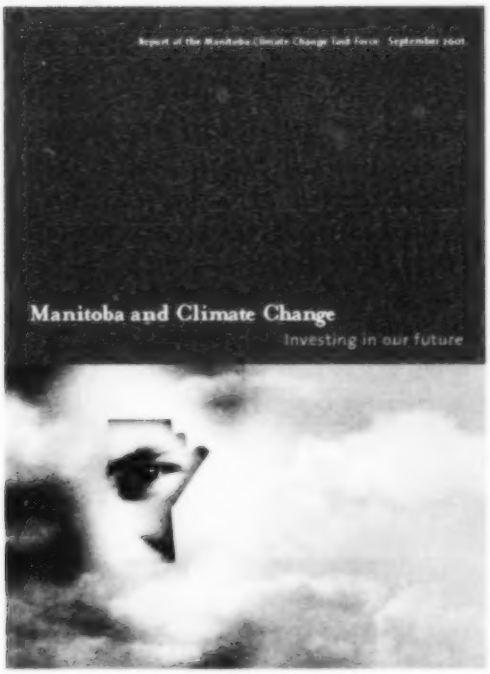
The Manitoba Climate Change Task Force, in its 2001 report titled *Manitoba and Climate Change: Investing in Our Future*, recommended that the Government of Manitoba require all new buildings to achieve energy targets 25% above the *Model National Energy Code for Buildings*.

The Committee agrees developing the Manitoba Supplement can be a quick process, simply by adopting or adapting the requirements from the existing criteria in the Commercial Building Incentive Program.

BENEFITS

This recommendation will:

- Quickly establish a set of additional energy efficiency requirements that result in continued cost effective new commercial construction in Manitoba.
- Help building developers, owners, designers, regulators, contractors, and inspectors maintain an edge in preparing for the future adoption of the updated *Model National Energy Code for Buildings*.
- Position Manitoba as a leader in new commercial building energy efficiency, and assist Manitoba in achieving its energy efficiency and climate change targets.



Front Cover of Manitoba and Climate Change report, Report of the Manitoba Climate Change Task Force

COMMENTARY

The Committee discussed at great length whether the Manitoba Amendments should require a level of building energy efficiency at least 15% better than the *Model National Energy Code for Buildings*, or 25% better. All committee members agree 15% is a realistic target requiring little effort. It is possible to achieve this level of additional energy efficiency with standard energy efficient lighting and additional building envelope insulation. Many committee members felt that 15% is easily achieved and, as a result, the Manitoba Amendments should require a level of building energy efficiency 25% better than *Model National Energy Code for Buildings* (1997). The rationale for this higher level of energy efficiency is: (1) it can be cost effective, (2) it too is achievable with upgrades to the building envelope alone (i.e., insulation), and (3) other technologies are readily available (e.g., more energy efficiency lighting).

RECOMMENDATION 10:

Include acceptance testing for code compliance in the Manitoba Amendments to the *Model National Energy Code for Buildings* (1997).

The Committee recommends including acceptance testing for code compliance in the Manitoba Amendments to the *Model National Energy Code for Buildings* (1997). Acceptance testing is just one step in building commissioning, and should be thought of as the first step to a future long-term requirement for fundamental building systems commissioning. Acceptance testing is engineering tests performed on finished building components, and sometimes referred to as functional testing, final testing, or validation testing. Building commissioning, as defined by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) in *Guideline 1–1996* is "the process of ensuring that systems are designed, installed, functionally tested, and capable of being operated and maintained to perform in conformity with the design intent.

The Committee recommends the Energy Code Task Group of the Manitoba Building Standards Board incorporate acceptance testing for the following building elements into the Manitoba Amendments:

- ventilation systems;
- space conditioning controls;
- mechanical systems, including air distribution system ducts and plenums, economizers, variable air volume systems, and hydronic system controls; and
- lighting controls.

The Committee also recommends the Energy Code Task Group of the Manitoba Building Standards Board work with design professionals, the Office of the Fire Commissioner, Authorities Having Jurisdiction, and the Association of Manitoba Municipalities to develop the necessary compliance forms, similar to those available on the California Energy Commission Web site for California's 2005 Energy Efficiency Standard.

INTENT

To help ensure that key building elements perform as designed and conform, as built, to the energy efficiency requirements of energy code.

RATIONALE

The *Model National Energy Code for Buildings* (1997) does not require building commissioning, or any of the basic elements of building commissioning such as acceptance testing.

There is no mechanism in the model energy code to ensure that the building is built according to the energy efficiency design intent.

All recommendations thus far have focused on establishing requirements for new commercial construction to be **designed** in accordance with the *Model National Energy Code for Buildings* (1997), with additional requirements to increase the level of building energy efficiency beyond the current requirements. Without acceptance testing there is no way to be sure new commercial construction will satisfy this design intent.

California's *2005 Building Energy Efficiency Standards*, Title 24 of the *California Code of Regulations*, requires acceptance testing for code compliance based upon acceptance requirements for code compliance.[12] Acceptance requirements for code compliance is a description of test procedures that includes equipment and systems to be tested, functions to be tested, conditions under which the test shall be performed, the scope of the tests, results to be obtained, and measurable criteria for acceptable performance. California has made available compliance forms for the 2005 Energy Efficiency Standards, which Manitoba could use as templates.[13]

Fundamental building systems commissioning is a prerequisite in the LEED® Green Building Rating System, which is being applied to building projects in Manitoba (e.g., Winnipeg International Airport site redevelopment, new Manitoba Hydro Downtown Office, new

Exterior view of Red River College Princess Street Campus. Image supplied by Corbett Cibinel Architects. Copyright Gerry Kopelow

Winnipeg Humane Society building). Also, the Province of Manitoba's new Green Building Policy will require LEED® certification for all new buildings funded in whole or in part by the Province. This indicates that the local market is going to become more familiar with building commissioning. Acceptance testing for code compliance is the first small step towards building commissioning.

BENEFITS

- Building developers and building owners can be assured that certain building systems perform, and achieve the level of energy efficiency, in accordance with the design intent.
- Building designers can confirm that the building is able to achieve the level of energy efficiency to which it is designed.
- The Province of Manitoba, Manitoba Hydro, Natural Resources Canada, and other stakeholders, can know that the building systems are achieving the level of energy efficiency required by the energy code.

COMMENTARY

Currently, no national code in Canada (e.g., *National Building Code, National Fire Code, National Plumbing Code, Model National Energy Codes*) requires commissioning or code compliance testing. The Energy Code Advisory Committee members agree it is an important component, however the members could not reach consensus on this recommendation. Some members feel it is an important component to help ensure the objectives of the energy code (e.g., more energy efficient commercial buildings) are met, and for this reason recommend that building commissioning become part of the Committee's main recommendations. Other committee members feel building commissioning is beyond the scope of our recommendations and a requirement the market is not ready for, and for these reasons suggested that building commissioning become part of the supplemental recommendations. The compromise is to recommend acceptance testing within the Committee's main recommendations and include fundamental building commissioning in the supplemental recommendations.

Exterior view of Sobeys Grant Park grocery store. Image supplied by Shindico Realty.

RECOMMENDATION 11

Support and participate in a national initiative to help update the *Model National Energy Code for Buildings*.

The Committee recommends Manitoba support and participate in a national initiative to help update the *Model National Energy Code for Buildings*, through the Building Energy Code Collaborative. By *support*, the Committee means providing both financial and human resources. By *participate*, the committee means Manitoba representatives actively participating, and taking a leadership role if asked, in the Collaborative and any standing committee established by the Canadian Commission on Building and Fire Codes.

INTENT

To share Manitoba's perspective and ensure its interests are represented during the development of the next update to the *Model National Energy Code for Buildings*.

RATIONALE

The provinces and territories have the constitutional authority for enacting building codes and standards in their own jurisdictions. For this reason the *Model National Energy Code for Buildings* cannot be updated without the support and participation of the provinces and territories. Ontario already references the model code in its Building Code, and in June 2006 announced modifications that will further increase the minimum energy efficiency levels in buildings. Other provinces and territories, including British Columbia, Saskatchewan, Quebec, and the Northwest Territories are all at a stage of developing Energy efficiency requirements for buildings. The federal government, through Natural Resources Canada, has offered to help the provinces and territories work together on a coordinated approach to meet their needs for energy codes through a new coordinating body called the Building Energy Code Collaborative. The Collaborative is a mechanism for representatives of both the energy and building code ministries from the provinces/territories to work together to generate support for updating the Model National Energy Code for Buildings. The Collaborative is also a mechanism to engage in discussions with the Canadian Commission on Building and Fire Codes, which holds the authority to update the model code.

BENEFITS

This recommendation:

- Creates opportunities for Manitoba to pool resources with larger jurisdictions during code development, offering economies of scale.
- Ensures consistency with national building energy efficiency requirements, and provides a consistent set of requirements for code enforcement officials, design professionals, and contractors across Canada.
- Opens the door to uniform, national education and certification programs.

When participating in the Building Energy Code Collaborative and/or any standing committee established by the Canadian Commission on Building and Fire Codes, the Committee encourages Manitoba to recommend the following:

- The Collaborative be co-chaired by one professional from the code perspective and one professional from the energy perspective, and membership of the collaborative include: architects, builders, building officials, building operators, building owners, engineers, manufacturers, policy makers, regulators, and utilities.

- The Canadian Commission on Building and Fire Codes reinstate the Standing Committee on Energy Conservation in Buildings, which was responsible for drafting the *Model National Energy Code for Buildings* (1997), as the Standing Committee on Energy Efficiency in Buildings.
- An updated *Model National Energy Code* for Buildings also apply to the major renovation of existing buildings. By *major renovation*, the Committee means instances where an owner wishes to rehabilitate a building or change its use, or where the economics of new construction apply. Special consideration should be given to the requirements for historic buildings, to ensure the updated model code does not conflict with the *Standards and Guidelines for the Conservation of Historic Places in Canada published by Parks Canada*.
- An updated *Model National Energy Code for Buildings* require a level of building energy efficiency a minimum 25% better than current *Model National Energy Code for Buildings* (1997). This level of minimum energy efficiency (25%) is the current requirement of the Commercial Building Incentive Program.
- An updated *Model National Energy Code for Buildings* reference the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE) Standard 90.1 (2004), and subsequent versions of Standard 90.1, in parts to be recommended by the Energy Code Task Group of the Manitoba Building Standards Board. This will help to ensure that the model code does not fall out of date, since Standard 90.1 is under continuous maintenance – a process ASHRAE uses to keep standards current by issuing addenda or revisions – and revised on a three-year cycle.
- An updated *Model National Energy Code for Buildings* consider and allow for passive building systems (e.g., natural ventilation; passive solar thermal heating) and additional energy supply technologies (e.g., district heating; photovoltaics).
- An updated *Model National Energy Code for Buildings* include acceptance testing for code compliance, similar to the requirements in the *2005 California Building Energy Efficiency Standards*, Title 24 of the *California Code of Regulations*.
- An objective-based approach similar to the new *National Building Code of Canada 2005*.
- Review and update the *Model National Energy Code for Buildings* on a cycle parallel to the review and update of the *National Building Codes*.

Exterior view of Ilimi Community Health Centre. Image supplied by LM Architectural Group, photography Jaime Tay.

Exterior view of Red River College Princess Street Campus. Image supplied by Corbett Cibinel Architects, Copyright Gerry Kopelow

CODE IMPLEMENTATION RECOMMENDATIONS

This section contains Recommendations 12 to 17, for the implementation of a commercial building energy code in Manitoba.

RECOMMENDATION 12:

Broadly communicate the Energy Code Advisory Committee recommendations.

The Committee recommends broadly communicating its recommendations. The Committee recommends using the following three tools to communicate the recommendations:

1. Printed copies of this report, in sufficient quantities so as to be available for distribution to organizations (if requested), at events such as conferences, and to professionals that will receive training on the new energy code. The Committee recommends the report be mailed to those who delivered expert presentations to the Committee, and to representatives of organizations that appeared in delegation before, or made a written submission to, the Committee (see Appendix B).

2. A prepared presentation, describing the recommendations and providing background information about the need for, and development of, an energy code. This presentation should be available for delivery by the Committee Chair, or appropriate alternate, to industry associations (e.g., Building Owners and Managers Association, Manitoba Building Officials Association) during their regularly scheduled events (e.g., luncheons, dinners); to stakeholders (e.g., industry professionals; trades) at their invitation; and at applicable conferences, such as the Better Buildings conference hosted in Winnipeg each May by Building Energy Management Manitoba.

3. A Web site with an easily identifiable address (e.g., www.energycode.mb.ca). The Committee recommends the energy code Web site include: (1) a joint message from the Minister of Energy, Science and Technology and the Minister of Labour and immigration; (2) a summary of the Committee's recommendations; (3) a downloadable copy of the committee's full report, in both PDF (Post Document Format) and HTML (Hypertext Mark-up Language) formats; and (4) four options for providing feedback: (i) submitting comments online with a feedback form, (ii) a downloadable form on which people can handwrite comments and return by facsimile or mail, (iii) an e-mail address to which to send comments, and (iv) a mailing address for people who prefer to provide their comments, or their organization's comments, in a letter. The Committee suggests these comments be compiled by Energy, Science and Technology and made available (a) on the Web site and (b) to the Manitoba Building Standards Board and the Energy Code Task Group.

INTENT

The intent of this recommendation is to broadly share the recommendations with all interested people and organizations (i.e., stakeholders).

RATIONALE

1. The development and implementation of the energy code for commercial buildings will affect many aspects of, and many people working in, the Manitoba commercial building industry.

2. Many professional organizations and trade associations host regularly scheduled events (e.g., breakfast meetings, luncheons; conferences) to provide their members with an opportunity to receive a presentation on a

topical issue. A commercial building energy code is one such topical issue.

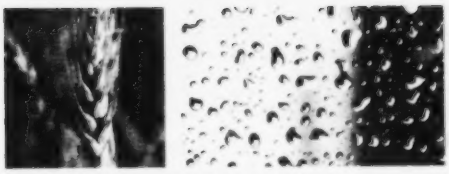
3. The first basic level of public participation, according to the International Association for Public Participation (www.iap2.org), is *inform*. The goal of *inform* is to provide stakeholders with balanced and objective information to assist them in understanding the problem, alternatives, opportunities, and/or solutions, with the use of tools such as Web sites. One way of satisfying the next level of public participation, *consult*, is to use these tools also as a means for accepting feedback.

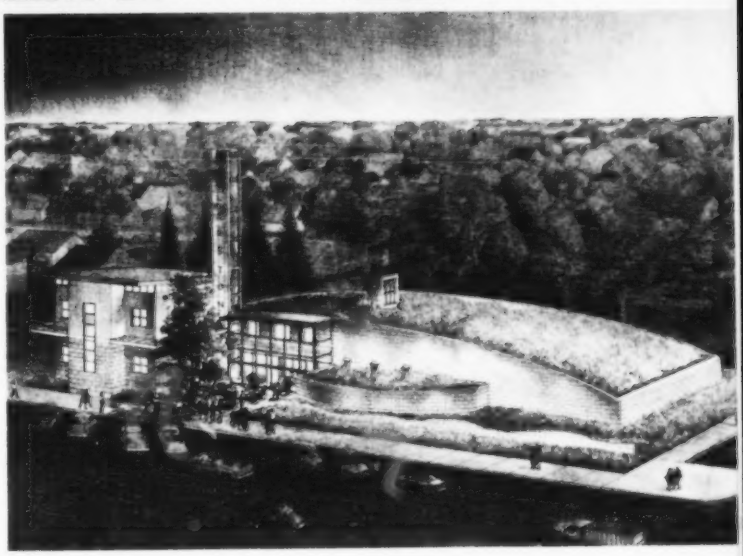
4. The organizations that made submissions to the Committee asked to be informed of the Committee's progress and final recommendations.

BENEFITS

This recommendation:

- Increases opportunities for building owners, design professionals, contractors, regulators, inspectors, and others to learn of and understand the Committee's recommendations. This may result in greater acceptance of and participation in the energy code and local market transformation.
- Follows the principles of transparency and accountability by providing the public with multiple points of access to the Committee's recommendations.
- Allows other jurisdictions, in Canada and around the World, to more easily learn of Manitoba's commercial building energy efficiency objectives. This may help Manitoba – a smaller jurisdiction - achieve these objectives, if by learning of Manitoba's approach a larger jurisdiction adopts a similar approach and in doing so creates a stronger market demand for technologies and services.





Exterior rendering of Gladstone Town Hall, image supplied by BridgemanCollaborative Architecture

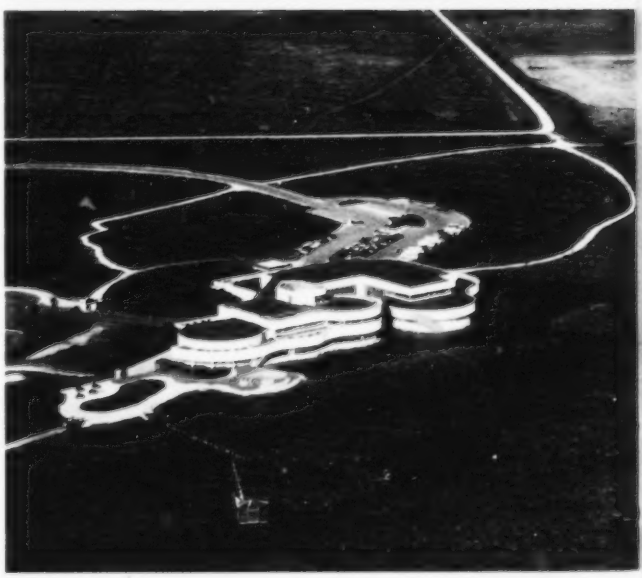
RECOMMENDATION 13:

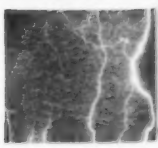
Undertake a public review of the Committee's recommendations in 2007

The Committee recommends a formal public review of these recommendations in 2007.

The Committee recommends a series of forums for interested members of the public, over a span of six weeks, at different locations within the province (e.g., Winnipeg, Brandon, and Thompson) and city of Winnipeg (e.g., downtown, south end). Each session should provide attendees an opportunity to (a) hear a 20-30 minute presentation, (b) participate in an open question and answer session of 20-30 minutes, (c) complete a feedback form (of the same format as the one on the energy code the Web site – see item 2 in Recommendation 12), and (d) participate in table discussions on key issues. The Committee recommends notice of the forums be posted on the energy code Web site, published in local newspapers, and sent to all relevant professional and trade associations. The Committee recommends a consultant be hired to coordinate the sessions and compile the comments in a report (including those received via the energy code Web site) to Manitoba Energy, Science and Technology. The Committee recommends this report be published on the energy code Web site, provided to the Office of the Fire Commissioner and Manitoba Hydro, and shared with the Energy Code Task Group of the Manitoba Building Standards Board.

The Energy Code Task Group of the Manitoba Building Standards Board should consider the public comments when developing the Manitoba Amendments, and document (for reporting purposes) how the comments were considered.





Top: Model of Aboriginal Personal Care Home. Image supplied by LM Architectural Group, photography Julie Epp
Bottom: Aerial view of Oak Hammock Marsh Interpretive Centre. Image supplied by Number Ten Architectural Group

Manitoba should use the comments to help establish decision-making principles, for its participation in the update of the *Model National Energy Code for Buildings*.

INTENT

To share the Committee's recommendations with the broader public, generate discussion, and obtain public feedback.

RATIONALE

According to *The Energy Act* (Section 11(3), Public consultation re regulation on energy efficiency), the Minister shall provide opportunities for public consultation in order to obtain advice and recommendations respecting the proposed regulation or amendment from persons affected by the proposed regulation or amendment.

The Terms of Reference for the Energy Code Advisory Committee (see Appendix A) asks the Committee to consider the requirements of *The Sustainable Development Act*. One of the Guidelines for Sustainable Development identified in Schedule B of the Act is public participation. According to the definition in Schedule B, public participation means: (a) establishing forums which encourage and provide opportunity for consultation and meaningful participation in decision making processes by Manitobans; (b) endeavouring to provide due process, prior notification and appropriate and timely redress for those adversely affected by decisions and actions; and (c) striving to achieve consensus amongst citizens with regard to decisions affecting them.

The second level of public participation, according to the International Association for Public Participation (www.iap2.org) is *consult*. The goal of *consult* it to obtain public feedback on analysis, alternatives, and/or decisions, listen to and acknowledge concerns, and provide feedback on how public input influenced decision-making, using tools such as surveys and public meetings.

The organizations that made submissions to the Committee asked to be involved in the development of the energy code. The Mechanical Contractors Association of Manitoba indicated that consultation with industry will be a key ingredient to successful implementation of the Code.

BENEFITS

This recommendation:

- Complies with *The Energy Act* and *The Sustainable Development Act*.
- Helps to educate the broader public about energy efficiency in commercial buildings, and the proposed development and implementation of the energy code.
- Provides an opportunity for public and additional stakeholder input to the Committee's recommendations, which can help inform the code development and implementation process for both the Manitoba Supplement and the update of the *Model National Energy Code for Buildings*.

RECOMMENDATION 14:

Provide information resources, and support education and technical resources, to help build industry capacity.

The Committee recommends providing information resources, and supporting education and technical resources, to help build the capacity of the local industry to meet the new requirements. The Committee recommends a multifaceted approach that allows professionals and non-professionals to work together with government, educational institutions, and industry associations to develop and provide targeted, effective, and efficient support.

The specific educational and resource requirements should be determined by the Market Capacity Study and Training Needs Analysis (see Recommendation 8). The Committee recommends that these resources include:

- A general information seminar and information package for building owners and developers, design professionals (e.g., architects, engineers, technologists), contractors, regulators, inspectors, and others, to inform everyone together of the energy code and provide an overview of the responsibilities of each.
- Training for people in the private sector (e.g., building owners, designers, contractors, trades), by their respective industry associations.
- Training for people in the public sector (e.g., code officials and Authorities Having Juris-diction), through the Manitoba Emergency Services College.
- Training for the appropriate students at universities, colleagues, and trade schools.
- Technical support for energy modeling to meet the performance path option, similar to that which is available in Saskatchewan from the Saskatchewan Research Council, to assist Commercial Building Incentive Program applicants.

The Committee feels quite strongly that the training programs should be coordinated, to ensure, for example, that what the building trades learn, is asked for by the building designers, and what the designers request, the building trades can deliver. The designers of the training programs should have the opportunity to participate in brainstorming and program design sessions to help ensure that the separate and specific programs they design are complimentary, not contradictory.

INTENT

To support industry adoption and implementation of the energy code.

RATIONALE

1. The organizations that made submissions to the Committee spoke of the need for education and training. The Mechanical Contractors Association of Manitoba, for example, suggested that an education committee be established to facilitate training, consisting of educators, architects, engineers, inspection authorities, and contractors.

2. The success of any policy or regulation depends to a large degree on the successful implementation of the policy or regulation. For this reason, the successful implementation of the energy code will depend to a large degree on the education and support available to professionals in the commercial construction industry.

Everyone in the building industry has a different role to play in meeting the requirements of the commercial building energy code. It is useful for each to understand the responsibility of the other. It is also importance for each to receive training specific and relevant to their role.

BENEFITS

- Greater acceptance of the energy code.
- Common understanding of the objectives and requirements of the code, and the roles of each professional at various stages of building development, design, construction, and inspection.
- Successful implementation of the energy code, resulting in cost-effective energy efficient buildings and measurable reductions in energy use.

Aerial rendering of Winnipeg International Airport Site Redevelopment Project.
Source: Architecture Ltd. and Hall Cooke Poli Architects, image supplied by Winnipeg Airports Authority

RECOMMENDATION 15.

Establish a process for energy code compliance.

The Committee recommends establishing a consistent process for demonstrating and confirming compliance with the energy code.

At the building permit stage, the Committee recommends:

- For Part 3 buildings, the prime design consultant (e.g., architect or engineer), be required to coordinate the submission of a brief design intent form with the building permit application to the Authority Having Jurisdiction, accompanied by either the Model National Energy Code for Buildings Mandatory Requirement Checklist (in the case of buildings designed to meet the prescriptive requirements of the energy code), or the EE4-CODE Compliance Report (in the case of buildings designed to met the performance-based requirements of the energy code).

- For Part 9 non-residential buildings, the building permit applicant be required to submit a brief design intent form, prepared by a qualified building designer, with the building permit application to the Authority Having Jurisdiction, accompanied by either the Model National Energy Code for Buildings Mandatory Requirement Checklist (in the case of buildings designed to meet the prescriptive requirements of the energy code), or the EE4-CODE Compliance Report (in the case of buildings designed to meet the performance-based requirements of the energy code).

Interior view of Plum Coulee Hockey Arena. Image supplied by Manitoba Hydro

The Authority Having Jurisdiction (a) verify completion of the building design intent form and supporting documentation; (b) keep the intent form and supporting documentation on file with all the other building permit information, and (c) make this documentation available to Manitoba Energy, Science and Technology for the evaluation of the energy code (Recommendation 17). Authorities Having Jurisdiction should not release the building permit until receipt of the design intent form and accompanying documentation.

The Committee also recommends the Energy Code Task Group of the Manitoba Building Standards Board work with design professionals, the Office of the Fire Commissioner, Authorities Having Jurisdiction, and the Association of Manitoba Municipalities to develop the design intent form.

At the occupancy permit stage, the Committee recommends:

The prime design consultant (e.g., architect or engineer) or the building permit applicant, be required to submit the acceptance testing results (see Recommendation 10) confirming compliance with the energy code to the Authority Having Jurisdiction.

The Authority Having Jurisdiction (a) verify completion of the compliance forms, (b) keep the compliance forms on file with the all other occupancy permit submittals, and (c) make this documentation available to Manitoba Energy, Science and Technology for the evaluation of the energy code (see Recommendation 17). Authorities Having Jurisdiction should not release the occupancy permit until the prime design consultant or the building permit applicant provides the acceptance testing results.

The Committee also recommends the Province establish a position for an energy code enforcement official to provide support to the Authorities Having Jurisdiction, including the City of Winnipeg and other larger municipalities.

To establish a process that is simple and straight forward for both the design professional, the building permit applicant, and the Authorities Having Jurisdiction.

The Mechanical Contractors Association of Manitoba suggested that the same authorities who administer the Manitoba Building Code administer the energy code.

There is a movement (e.g., the City of Winnipeg's new *Building Design Summary* for commercial projects) to using forms to standardize the submission and review of building information.

This recommendation:

- Establishes an efficient, universal (i.e., province-wide) standard for verifying compliance with the energy code. This universality, simplifies the process for both the design professionals and the code officials, saving time and money.
- Simplifies the sourcing of documentation for Manitoba Energy, Science and Technology's evaluation of the energy code.

RECOMMENDATION 16

Regularly review and update the Manitoba Amendments to the energy code

The Committee recommends a regular review and update of the Manitoba Amendments, if the *Model National Energy Code for Buildings* is not updated regularly (i.e., every three to five years). To complete this task, the Committee recommends:

- The Manitoba Building Standards Board reconvene the Energy Code Task Group each time there is a need to update the Manitoba Amendments.
- Manitoba Energy, Science and Technology provide secretariat support to the Energy Code Task Group.
- The Department responsible for *The Buildings and Mobile Homes Act* adopt the Amendments.

INTENT

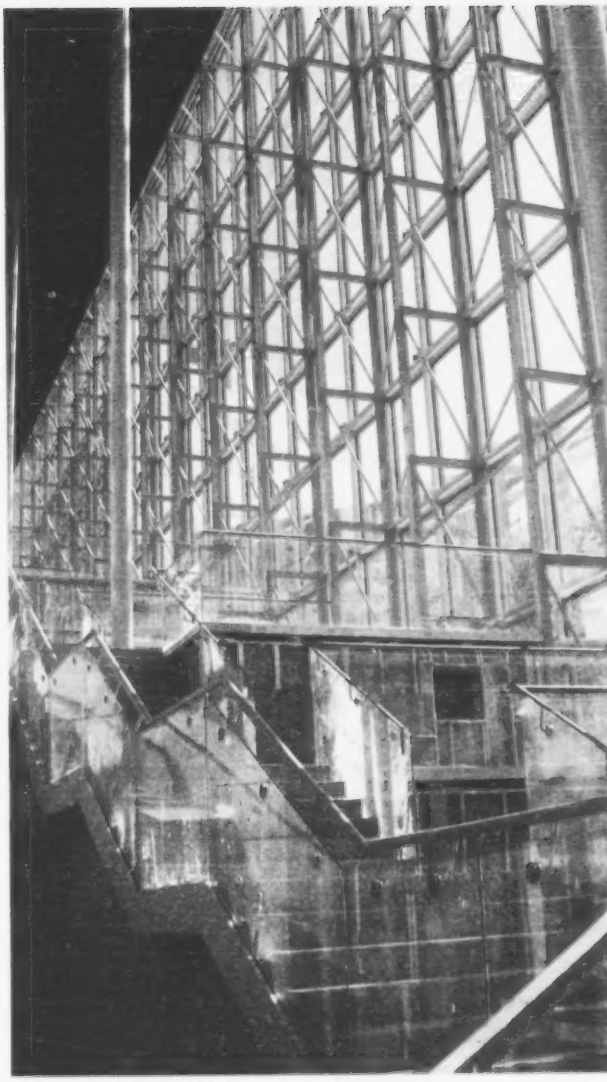
To keep the energy code current.

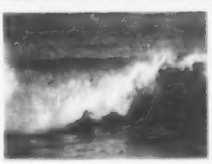
RATIONALE

To be effective, and to remain current with advancements in building design, changes in energy prices, and improvements in technologies, energy codes must be updated regularly. The current *Model National Energy Code for Buildings* (1997) has not been updated, nor subject to regular review.

BENEFITS

- The energy code is responsive to changes in the market.
- There is an opportunity to make regular updates and changes to the Code to incorporate comments from design professionals and enforcement officials working with the code.





Interior view of Millennium Library. Image supplied by Manitoba Hydro

The Committee recommends an evaluation of the energy code, starting with a baseline assessment in 2008 and every three years thereafter, to assess impacts and progress. This process should include an evaluation of, at minimum, the following six elements:

- Implementation and compliance
- Cost impacts (building specific and market aggregate)
- Energy savings
- Greenhouse gas savings
- Occupant comfort
- Recommended actions to address any issues

The Committee recommends Manitoba Energy, Science and Technology undertake the evaluation, present the results to the Manitoba Building Standards Board, and make the results public on the energy code Web site (see Recommendation 12). The Energy Code Task Group of the Manitoba Building Standards Board should consider the evaluation when updating the energy code (see Recommendation 16). Manitoba should consider the evaluation when participating in updates of the *Model National Energy Code for Buildings*.

The Committee recommends the evaluation follow the guidelines available from the Treasury Board of Canada Secretariat's Centre of Excellence for Evaluation and the Canadian Evaluation Society.

INTENT

To formally evaluate the success – defined as (a) reducing energy use in new commercial construction, and (b) resulting in cost-effective commercial buildings – of the energy code.

Best practice requires that governments evaluate the success of their programs and policies to ensure they are effective, achieving the stated goals and objectives, resulting in favourable outputs and outcomes, and to make necessary changes where required. Formal evaluation allows for the development and assessment of appropriate indicators, which illustrate the degree of success. Scheduled review of regulations likely occurs too infrequently to allow for effective adaptation and influence on market transformation.

According to *The Energy Act* (Section 6, Report on energy in Manitoba), "The department shall prepare a report entitled "Energy in Manitoba" within two years after the coming into force of this Act and at least once every five years after that, which may include the following: (a) a description of the role and place of energy in the provincial economy, including the development, production, supply, importation, exportation, pricing and cost of energy; (b) forecasts respecting the short term and long term energy requirements of the province; (c) a description of any change in the rate of use, and the level of efficiency of use, of energy from previous periods; (d) a description and consideration of current and emerging issues and trends respecting energy, including any related environmental matters.

The Province of Manitoba may receive funding from other supporters for the development and implementation of the energy code. All funders

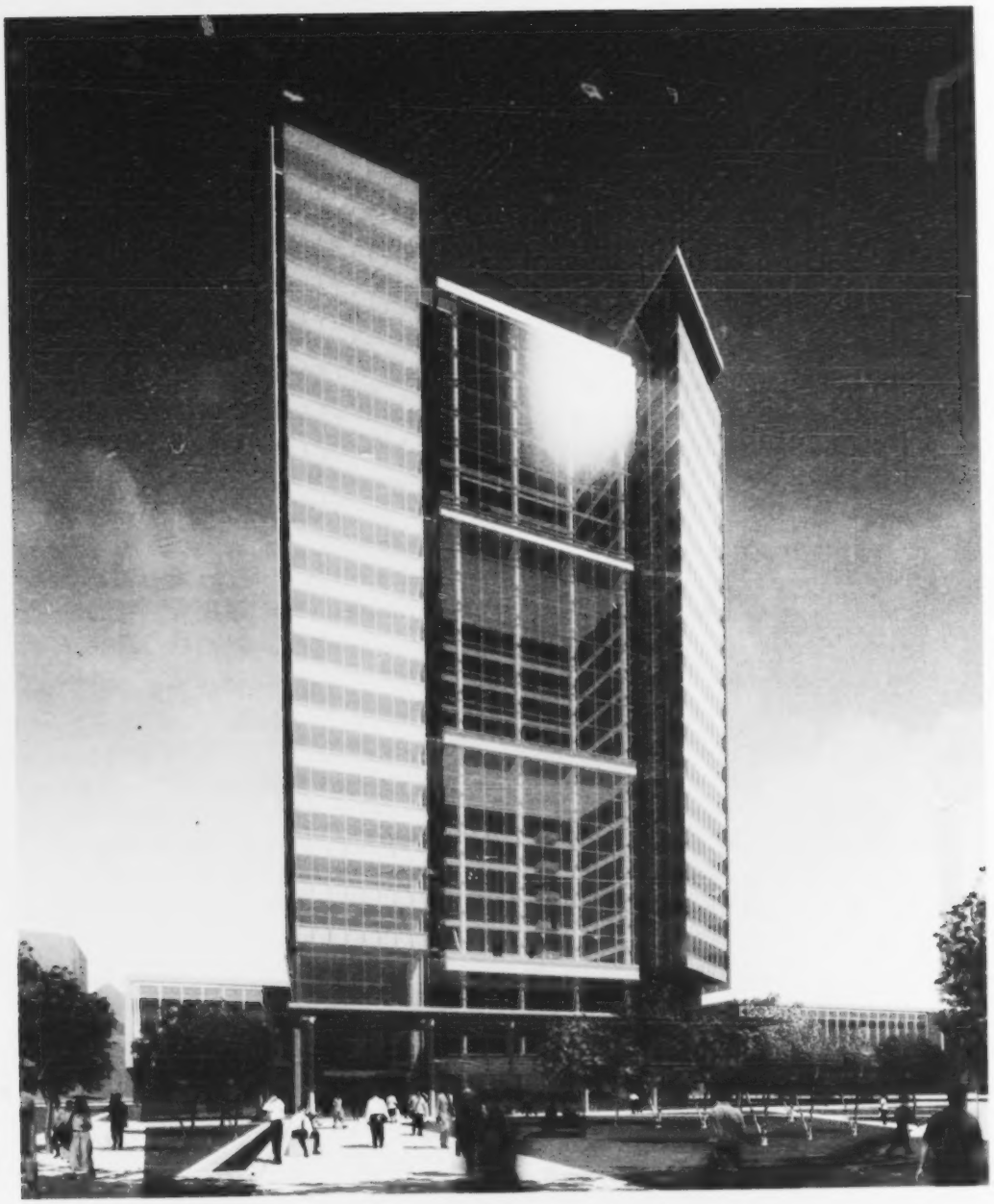
require reporting on monies allocated, as well as the outputs and outcomes that result from providing funding.

This recommendation provides:

- A mechanism for feedback, learning, and improvement, allowing for timely adjustments to the Code and the continued construction of cost-effective energy efficient commercial buildings.
- Public accountability and transparency of provincial resources allocated to the development and implementation of the Code.
- Manitoba Energy, Science and Technology with information about the level of efficiency of use of energy in commercial buildings, which can feed into the *Energy in Manitoba* report.

Exterior view of City of Winnipeg Water and Waste Department Head Office. Image supplied by Manitoba Hydro

SUPPLEMENTAL RECOMMENDATIONS



Exterior Rendering of future Manitoba Hydro new corporate headquarters, Winnipeg.
KPMB and Smith Carter Architects. Image supplied by Manitoba Hydro.

Many members of the Energy Code Advisory Committee are aware of emerging initiatives in the building industry beyond energy efficiency. These initiatives include improving water efficiency, more sustainable building site selection, and the use of building materials that reduce environmental impacts. These additional elements, along with energy efficiency, have emerged under the umbrella of green building.

Due to the increasing popularity of green building and sustainable building, the Committee felt it important to provide additional supplementary recommendations beyond the energy efficiency recommendations requested by the Minister.

Recent developments in the United Kingdom, the United States, Canada, and Manitoba offer six examples of the increasing global, national, and local predominance of green and sustainable building:

- In 2004, in response to a Sustainable Buildings Task Group report, the U.K. Government announced a Code for Sustainable Buildings. The new code will establish higher standards for energy and water efficiency, as well as waste and the use of materials.[14]
- Following a White House Summit on Federal Sustainable Buildings, held in January 2006, 19 U.S. federal government departments and agencies signed The Federal Leadership Memorandum of Understanding to adopt Guiding Principles for High Performance and Sustainable Buildings. The MOU identifies a number of guiding principles, including integrated design and building commissioning.[15]
- In February 2006, the American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE); the U.S. Green Building Council (USGBC); and the Illuminating Engineering Society of North America (IESNA) agreed to co-sponsor the development of a new minimum standard for high performance green building – *Standard for the Design of High-Performance Green Buildings Except Low-Rise Residential Buildings* – to drive green building into mainstream practices.[16]
- In Canada, Public Works and Government Services Canada, the provinces of Alberta and Manitoba, the Regional Municipality of York, and the cities of Vancouver and Calgary have adopted the Canada Green Building Council's LEED® Canada-NC Green Building Rating Systems as a requirement for all new government buildings. Public Works and Government Services Canada has also adopted the Building Owners and Managers Association's Go Green Program for all existing federal government buildings.
- The Manitoba Round Table for Sustainable Development (comprised of 35 members, including 8 Cabinet Ministers) formed a Green Building Committee in early 2006. One of the Committee's preliminary recommendations to the Round Table is for all new provincial buildings, and all buildings receiving provincial funding, be certified LEED® Sliver.
- In June 2006, the Province of Manitoba announced a new Green Building Policy. The policy is applicable to all government buildings and all buildings receiving provincial funding. The Policy requires a minimum LEED® Sliver certification, energy efficiency requirements 33% better than the *Model National Energy Code for Buildings*, adherence to Manitoba Hydro's Power Smart Design Standards, and the use of integrated design.

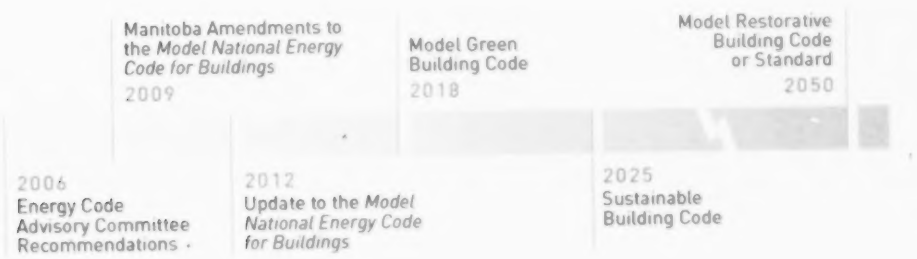
The Committee recommends considering an energy code as the critical first step in a longer-term process towards a sustainable building code.

As described on the previous page, there is increasing predominance of codes, standards, and government policy referencing green and sustainable building practices. Although the terms green and sustainable building are sometimes used interchangeably, this language is being refined as our understanding of these practices matures. One means of delineating these terms, in reference to the natural environment, is to think of green building as reducing negative impacts on the environment, and sustainable building as eliminating negative impacts on the environment. A third term, restorative building, is emerging to describe building practices that have a positive effect on the environment.

The market benefits from receiving signals of future direction well in advance. This allows stakeholders to prepare for changes to come, fostering competitiveness, innovation, and early voluntary compliance.

The time scale below provides one possible timeline for considering an energy code as the first step in a longer-term process toward a sustainable building code. The time scale begins at 2006 with the recommendations of the Energy Code Advisory Committee, the development of the Manitoba Amendment to the *Model National Energy Code for Buildings* by 2009, and an update to the *Model National Energy Code for Buildings* perhaps as early as 2012. With the current momentum for green building, it is perhaps possible to envisage a Model Green Building Code by 2018, followed by a Sustainable Building Code around 2025. Finally, in the next 40 to 50 years there may be demand to establish a Model Restorative Building Code.

The Energy Code Advisory Committee acknowledges that for some people these changes cannot come soon enough, and for others these changes are outside the realm of what is appropriate to include in building codes. In light of these differing views, a long-term dialogue, allowing for the presentation and respect of all perspectives, will be necessary in order to realize substantial movement on the time scale offered here.



RECOMMENDATION S2:
Support the use of the Integrated Design Process

The Committee recommends supporting the use of the Integrated Design Process.

One key to green building, sustainable building, and cost-effective measurable increases in building energy efficiency is the use of a building design process called the Integrated Design Process. Integrated design is a holistic, collaborative, and comprehensive design process that brings together all design professionals and specialty consultants, along with the building owner, the occupant(s), and other direct stakeholders to design the building as a team. It is not a series of meetings where responsibilities and tasks are assigned, but instead a process whereby people work together to design the building. The Committee recommends the following actions to markedly increase the use of integrated design by building design teams in Manitoba:

- The Province of Manitoba specify integrated design in tender calls for all new construction projects.
- Manitoba Hydro develop a program to provide technical assistance to building design teams new to integrated design, OR issue a call for proposals to organizations capable of providing this service with funding from Manitoba Hydro and Natural Resources Canada.
- Manitoba post-secondary institutions collaborate to develop and deliver courses on integrated building design to students and professionals.

Exterior rendering of Winnipeg Humane Society facility. Image supplied by Number Ten Architectural Group

RECOMMENDATION S3
Encourage building commissioning.

The Committee recommends encouraging building commissioning.

Commissioning is defined by the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) in Guideline 1–1996 as "the process of ensuring that systems are designed, installed, functionally tested, and capable of being operated and maintained to perform in conformity with the design intent." The guideline states, "Commissioning begins with planning and includes design, construction, startup, acceptance and training, and can be applied throughout the life of the building."

Building commissioning improves energy performance, optimizes energy use, reduces operating costs, ensures adequate orientation and training of building operations & maintenance staff, and improves the documentation of installed building systems.

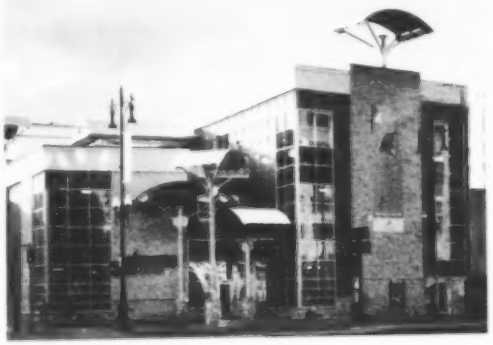
According to Public Works and Government Services Canada, "Experience to date indicates that full commissioning adds 1% to 4% to the cost of the project. However, experience also indicates that the cost of commissioning is more than recovered during the initial year of operation."[17]

Manitoba Hydro, through its suite of Power Smart programs, offers the Commercial Building Optimization Program, which is a retro-commissioning program for existing buildings.

Commissioning of new buildings, designed to meet a new energy code for buildings, will help to ensure that the building is constructed to and can operate, according to the intended design. It will help to ensure the energy, greenhouse gas, and cost savings calculated during the design phase are fully realized.

The Committee recommends:

- The Province of Manitoba require all new provincially owned or provincially funded buildings be commissioned according to accepted standards and guidelines, such as the American Society of Heating, Refrigeration and Air-Conditioning Engineers (ASHRAE) Guideline 1–1996, and the Model Commissioning Plan Guide and Specifications available from Portland Energy Conservation, Inc.
- Red River College offer a building commissioning program for qualified practicing professionals.
- Manitoba Energy, Science and Technology, and Manitoba Hydro formally ask Natural Resources Canada to expand the scope of the Commercial Building Incentive Program to encourage fundamental building commissioning.



Exterior view of Mountain Equipment Co-op store. Image supplied by Prairie Architects Inc. Copyright Gerry Kopelow

APPENDIX A:
TERMS OF REFERENCE

The Energy Code Advisory Committee (the "Committee") is established by the Minister of Manitoba Energy, Science and Technology (the "Minister") under authority of *The Energy Act* (see subsection 9.2).

This document sets forth the terms of reference for the Committee. This includes the Committee's mandate, guidelines for membership, as well as the operating procedures it is to follow.

The Committee's purpose is to develop a strategy by March 31, 2006 that provides advice and recommendations to the Minister about the development, adoption and enforcement of a comprehensive set of cost-effective minimum energy efficiency requirements for buildings in Manitoba (i.e. an "energy code") that would become effective no later than January 1, 2008. This strategy shall take into account:

- any significant socio-economic impact of the proposed requirements;
- requirements of *The Sustainable Development Act*;
- the goals and objectives of Manitoba Hydro's Power Smart Plan; and
- Manitoba's commitment to reduce greenhouse gas emissions.

The Committee shall assess whether there are basic minimum energy efficiency requirements that could be implemented on an interim basis prior to the adoption of a comprehensive energy code.

The scope of the Committee's strategy shall include buildings from both the commercial sector (e.g. offices, retail space, multi-family buildings, etc.) and institutional sector (e.g. schools, personal care facilities, hospitals, etc.).

The Committee's strategy shall cover the design and construction of:

- new buildings;
- additions to existing buildings; and
- major renovations to existing buildings where the economics of new construction apply.

In developing its strategy, the Committee shall assess the merits of adopting:

- a revised and updated version of the *Model National Energy Code of Canada for Buildings 1997*; or
- the most recent version of the ASHRAE 90.1 Standard *Energy Efficient Design of New Buildings Except Low-Rise Residential Buildings*.

The Committee shall be chaired by Manitoba Hydro and consist of not less than 12 voting

members appointed by the Minister from the following groups:

- Provincial government (Labour; Transportation and Government Service; Energy, Science and Technology)
- Federal government (Natural Resources Canada)
- Municipal government (City of Winnipeg, Association of Manitoba Municipalities)
- Building designers (Manitoba Association of Architects, Association of Professional Engineers and Geoscientists of Manitoba)
- Building owners/managers (Manitoba Chapter of the Building Owners and Managers Association)
- Contractors (Winnipeg Construction Association, Construction Association of Rural Manitoba)
- Members at large (Building Energy Management Manitoba; Manitoba Chapter of the Canada Green Building Council)

A secretary and technical advisor(s) to the Committee may be appointed at the pleasure of the Committee's chair. They are not members of the Committee and do not have voting privileges.

Members of the Committee shall be appointed for a term that ends March 31, 2006 and may be reappointed by the Minister for further terms subject to maintaining a reasonable degree of membership rotation.

Membership is to include those broadly knowledgeable in energy efficiency matters in the buildings sector who can reflect the relevant interests of industry, government and utilities. However, members are also to be chosen for their individual interests and abilities, rather than as delegates of any particular association or group and are expected to exercise broad objective judgements.

The Committee may establish task groups with specific assigned tasks. These groups shall continue in existence only until their tasks have been completed. The chair of each task group shall be selected from the membership of the Committee. Other members of task groups need not be members of the Committee.

Attendance at meetings of the Committee and its task groups shall be open to members of the public wishing to attend except as stipulated in 4.2.

The Committee chair shall have the authority to hold in-camera sessions when considered necessary because of the nature of the subject being discussed. A report on each in-camera session and the reason it was held shall be provided to the Minister.

Members of the public intending to attend a Committee meeting shall notify the chair or secretary at least two days in advance of the meeting so that appropriate meeting space can be provided.

Participation in Committee discussions shall normally be limited to Committee members and assigned staff except that guests and

other members of the public may participate subject to the normal rules of order. The time allotted to guests and members of the public shall be at the discretion of the chair.

Advance notice of meetings shall normally be provided at least 30 days in advance to Committee members and assigned staff.

Committee meetings shall be held in Winnipeg unless otherwise specifically approved by the chair.

A quorum shall consist of 50% of the total voting membership of the Committee.

It is not necessary that all Committee decisions be determined by formal motions and votes. It is often sufficient for the chair to sum up the discussion on each point to reflect the "sense of the meeting" subject to the agreement of the Committee without objection. The chair should ensure that such summary decisions are clear and understood by all so that they may be properly recorded in the minutes.

Decisions on all formal motions that are introduced shall be established by a majority vote of those present. Recoded negative votes at meetings shall be accompanied by reasons for so voting and shall be included in the minutes.

It is highly desirable that all Committee recommendations be developed on the consensus principle. Consensus requires that all opinions be considered and weighed and that any statement of Committee agreement should be reached only after full and fair discussion of the issues involved.

The minutes shall be as brief as possible with all decisions clearly recorded and any necessary supporting or background information included as appendices. The minutes shall record the date and place of the meeting and list those in attendance and those absent. Names of movers, seconders, discussers and voters shall not be recorded in minutes unless specifically requested for such actions. Each set of minutes shall contain a "list of Actions" arising from the meeting and the names of those responsible for such actions.

The minutes form an important part of the permanent record of the Committee's work and shall be formally approved at the next or subsequent meeting of the committee, subject to the correction of any errors or omissions.

All inquiries with respect to the Committee's work shall be channeled through the secretary or chair.

All correspondence which could be interpreted as reflecting the views of the Committee shall be signed by the chair or other person designated by the chair.

All notices of meetings, agenda and supporting papers for the Committee shall be distributed by the secretary.

6.0 TRAVEL AND OTHER EXPENSES

Members of the Committee or its task groups who are not provincial or federal civil servants or employees of Manitoba Hydro may, on prior request to the chair and in accordance with Government of Manitoba travel guidelines, be reimbursed for out-of-pocket expenses incurred in attending Committee meetings.

Committee members are deemed to be volunteers and no remuneration will be provided.

APPENDIX B:
PRESENTATIONS AND SUBMISSIONS

EXPERT PRESENTATIONS

Bob Bach, P. Eng, Energy Profiles Ltd.
Energy Code Scope and Application

Curt Hepting, P. Eng., EnerSys Analytics Inc.
Assessment of ASHRAE 90.1 for British Columbia and Manitoba

David Johnston, President, What's Working Inc.
An Integral Approach to Market Transformation

STAKEHOLDER SUBMISSIONS

Building Energy Management Manitoba
(written)

Building Owners and Managers Association
(written)

Manitoba Building Officials Association
(delegation)

Mechanical Contractors Association of Manitoba
(written)

The Committee is grateful to the experts and stakeholders, who shared information, offered perspectives, and asked questions.

The Committee also acknowledges the participation of Pierre Guèvremont and Michel Lamanque of Natural Resources Canada.

APPENDIX C:
COMMITTEE MEMBERS AND STAFF

Ken Allard,
City of Thompson

Tom Akerstream,
Manitoba Hydro

Nancy Anderson,
Dennis Beacham (Alternate),
Manitoba Labour and Immigration

Richard Andrich,
The Forks North Portage Partnership

Anne Auger,
Natural Resources Canada

Bob Downs,
Shindico Realty Inc.

Robert Eastwood,
Number Ten Architectural Group

Chris Hewitt,
SMS Engineering Ltd.

Deepak Joshi,
City of Winnipeg

Ken Klassen,
Manitoba Energy, Science and Technology

Rodney C. McDonald (Chair),
Manitoba Hydro

Bert Phillips,
UNIES Ltd.

Rodney Wiebe,
Ben Wiebe Construction (1985) Ltd.

David Woelk,
Bockstael Construction

Sue Ziemski,
CREIT Management

Colleen Kuruluk (Secretary),
Manitoba Hydro

Kelly Epp,
Manitoba Hydro

ENDNOTES

James Hoggin and Associates Inc. (2006, March 31). Nine in 10 Canadians fear our lifestyle is not sustainable: Most blame lack of government leadership. Retrieved April 18, 2006 from www.hoggan.com/sustainability_release_2006_march31.html.

Canadian Renewable Energy Alliance. (2005, May). Preliminary framework for a national renewable energy strategy for Canada. Retrieved April 18, 2006 from www.canrea.ca/pdf/CanREA-framewrk-Nov05-hi.pdf.

American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Inc. (2005). Navigation for a sustainable future: ASHRAE research strategic plan 2005-2010. Retrieved May 5, 2006 from www.ashrae.org/content/ASHRAE/ASHRAE/ArticleAltFormat/20064171337676_347.pdf.

American Institute of Architects. (2005, December 19). Architects call for fifty percent reduction by 2010 of fossil fuel used to construct and operate buildings. Retrieved May 6, 2006 from www.aia.org/release_121905_fossilfuel.

World Business Council for Sustainable Development. (2006, March 29). Top global companies join with WBCSD to make energy self-sufficient buildings a reality. Retrieved May 5, 2006 from www.wbcsd.org.

Boyd, D.R. (2004). Sustainability within a generation: A new vision for Canada.Vancouver: David Suzuki Foundation. Retrieved May 10, 2006 from www.davidsuzuki.org/files/WOL/DSF-GG-En-Final.pdf.

Province of Manitoba. (2005, December). Green and growing: Building a green and prosperous future for Manitoba families. Retrieved May 7, 2006 from www.gov.mb.ca/greenandgrowing/green.pdf.

The European Union. Directive 2002/91/EC of the European Parliament and of the Council of 16 December 2002 on the energy performance of buildings. Retreived March 7, 2006 from europa.eu.int/eur-lex/lex/LexUriServ/LexUriServ.do?uri=CELEX:32002L0091:EN:HTML.

Office of the Deputy Prime Minister, United Kingdom. (2006, March 15). Revised building regulations to tackle climate change laid in parliament. Retrieved March 23, 2006 from www.docklandsdevelopments.ltd.uk/Articles/ENER.%20CHANGE%20REQUIREMENTS%202006.pdf.

The China Sustainable Energy Program. Commercial buildings energy efficiency code. Retrieved March 7, 2006 from www.efchina.org/home.cfm. Also see: Worldwatch Institute. (2005, October 20). China aims to build energy-efficient society in next five years. Retrieved March 7, 2006 from www.worldwatch.org/features/chinawatch/stories/20051020-2.

U.S. Department of Energy, Energy Efficiency and Renewable Energy, Building Energy Codes Program. (2004, December 13). Status of state energy codes. Retrieved March 7, 2006 from www.energycodes.gov/implement/state_codes/index.stm.

California Energy Commission. (2004, September). 2005 building energy efficiency standards for residential and nonresidential buildings. Retrieved May 7, 2006 from www.energy.ca.gov/title24/2005standards/2004-11-04_400-03-001-F.PDF.

California Energy Commission. (2006). Approved compliance forms for the 2005 energy efficiency standards. Available at www.energy.ca.gov/title24/2005standards/2005_compliance_forms/index.html.

Department for Environment and Rural Affairs, United Kingdom. (2004, July 27). Government moves ahead with developing new code for sustainable buildings. Retrieved March 28, 2006 from www.defra.gov.uk/news/2004/040727a.htm.

United States Environmental Protection Agency. (2006, January). Federal leadership in high performance and sustainable buildings memorandum of understanding. Retrieved March 7, 2006 from www.epa.gov/greeningepa/projects/buildings_mou.htm.

U.S. Green Building Council. (2006, February 16). Standard to bring green building to the mainstream. Retrieved May 4, 2006 from www.usgbc.org/News/USGBCNewsDetails.aspx?ID=2150.

Rogers, C. (1998, June 18). Commissioning in Public Works and Government Services Canada. Retrieved March 23, 2006 from www.myflorida.com/fdi/edesign/news/9806/draft_com.htm.

Thank you to the following firms and organizations for supplying and/or authorizing the use of images in this report:
BridgemanCollaborative Architecture City of Winnipeg Corbett Cibinel Architects Friesen Tokar Architects
LM Architectural Group Manitoba Hydro Northern Sky Architecture Inc Number Ten Architectural Group
Prairie Architects Inc Sears Canada Inc Shindico Realty Inc Smith Carter Architects and Engineers Inc
SMS Engineering Ltd University of Manitoba Winnipeg Airports Authority